

see. At first glance, an Oriyā book seems to be all curves, and it takes a second look to notice that there is something inside each.

The earliest example of the language which is at present known consists of* some Oriyā words in an inscription of king Nara Singha Deva II, dated 1296 A.D. An inscription of Nara Singha Deva IV, dated 1395 A.D., contains several Oriyā sentences, which show that the language was then fully developed, and was little different from the modern form of speech either in spelling or in grammar. Literature.

Oriyā literature* is however of comparatively recent growth, none of the existing works, so far as can be ascertained, going back beyond the 16th century A.D. It consists exclusively of verse, and, as is natural with a conservative people like the Oriyās, the earliest works extant are religious, viz., a few songs and certain paraphrases of the Sanskrit Purānas and epics. No work is so much venerated as the *Bhāgavata* of Jagannātha Dāsa; and next in estimation come the *Rācāna* of Balarāma Dāsa, the *Bhārata* of Sārōlā Dāsa and the *Haricaṇṣa* of Achyutānanda Dāsa. All these were composed in the first half of the 16th century A.D., to which period may probably be referred popular songs like the *Kesabakoili* or cuckoo-song about Krishna. Profane literature appeared later, and at first dealt only with mythological stories. Among the oldest of these is the poem *Rasa-kallola* by Dīnakrishna Dāsa. This poem describes the early career of Krishna, and is a favourite with the Oriyās; its versification is peculiar in making every line begin with the same letter *ka*. The most famous of the Oriyā poets is Upendra Bhanja, who, following Dīnakrishna Dāsa flourished in the early beginning of the 18th century. One of the royal family of Gumsur, a petty hill State in the north-west of Ganjām district, he was driven to take refuge in Orissa in the course of a civil war, and there devoted his life to Oriyā literature. Of his voluminous compositions, forty-two are at present known, the bulk of them consisting of poems with love-stories as their theme. He was apparently the first Oriyā poet to free himself from the trammels of exclusively religious and mythological influences. His poems labour under the defects of obscenity and unintelligibility; but they show at the same time a master's hand in letter-selection or rhetorical excellence. In these qualities his only rival is Abhimanyu Sāmanta Singhār, a zamīndār of Golakunda in the Jāipur sub-division of this

* I am indebted to Bābu Monmohan Chakravarti, M.A., B.L., M.R.A.S., for this account of Oriyā literature.

district, who died in 1806 when only 49 years old. His poem *Bidagdha-Chintāmani* is a veritable store-house of rhetorical excellence; while its latter cantos explain in lucid lines the abstruse doctrines of Vaishnavite *Bhakti* and *Prema*.

During the British period Oriyā poetry has shown no progress. It is represented by a few doggerel compositions and some small pieces of verse, among which a collection of short poems by Rai Rādhā Nāth Rai Bahādur, late Inspector of Schools, Orissa, deserves notice. Prose is, however, being carefully studied and has a promising future.

RELI-
GIONS.

Hindus.

Orissa is the Holy Land of the Hindus, which through all its vicissitudes has held its high place in the religious esteem of the people. The Purānas are full of descriptions of its sanctity, and it is declared to be the favourite abode of the Devatās and to boast a population composed, more than half, of Brāhmins. From end to end, we are told, it is one vast region of pilgrimage (*tirtha*); its happy inhabitants live secure of a reception into the world of spirits; and those who visit it and bathe in its sacred rivers obtain remission of their sins. According to popular belief, even the victorious Musalmān who led Akbar's invading host into this land of sanctity, was struck with amazement at its sacred river, the Mahānadi, its vast crowds of Brāhmins and its lofty temples of stone, and exclaimed "This country is no fit subject for conquest or for schemes of human ambition. It belongs entirely to the gods and is one great region of pilgrimage throughout." From the moment the pilgrim crosses the Baitarani river he treads on holy ground; and in these circumstances it is not surprising that the great bulk of the population of the district is composed of Hindus, who with 2,002,573 souls account for 97 per cent. of the people.

Muham-
madans.

Practically all the remainder are Muhammadans, who number 57,356 persons, or 2.78 per cent. of the people. It is somewhat strange at first sight that they are not more numerous, considering the strong footing they once had in the district. Badāoni, who was a zealous Moslem, describes Cuttack as being a mine of unbelief when it was subdued by Sulaimān, but the Muhammadans effectually conquered the Province and took complete possession of it in 1568 A.D.; and subsequently in Akbar's reign, when the Afghān kingdom of Bengal was overthrown by the Mughals, the Afghāns migrated in large numbers into Orissa and there held large fiefs and independent power. When they again rose in revolt, they were signally defeated, and in order to deprive them of the means of political combination, Shujait Khān distributed them among the villages in the interior, but allowed them

grants of lands sufficient to maintain their dignity. Orissa long remained a dependency of the Mughal Empire, and the Afghans continued in possession of their *jāgirs*; but with the lapse of centuries they dwindled in numbers and in influence. The Muhammadan conquest was not only late chronologically, but it failed to attain that permanence and completeness which it obtained in Bengal. It was a conquest rather than a colonization, the Mughals and Afghans made few converts to Islam, and the present Muhammadan residents of the district are nearly all descendants of the invaders. Their number has increased but little since 1872, when they amounted to 40,262 persons, but on the other hand their growth has been relatively greater than that of the followers of other religions. They form a small community, mostly in easy circumstances—a fact which favours their multiplication at a rate hardly attainable by the general mass of the population.

Christianity was practically the only other religion represented Christians. at the census of 1901. The number of Christians (2,652) is still comparatively small; and they are almost entirely confined to Cuttack town, which is the head-quarters of the Baptist and Roman Catholic Missions. The labours of the Baptist missionaries date from 1822, but in spite of their earnest efforts they have made but little progress in actually converting the people. The first native convert was baptized six years after the establishment of the Mission; and by 1872 the total number of native Christians was only 1,911. This growth was to a great extent due to the fact that the famine of 1865-66 contributed largely to its ranks, as over 650 famished children, whose parents had died of starvation or had deserted their offspring in the last extremity of famine, were rescued and brought up in the Christian faith. Since 1872 the Christian community in Cuttack has remained practically stationary; among those who lost caste from eating in the mission kitchens were many old men and women who left no children to take their place; and the total number of native Christians attached to the Mission is even now only about 2,000. On the other hand, it has done an immense amount of indirect good; the Baptist missionaries were the first to start properly conducted schools; and the Cuttack Mission Press, which has the distinction of being the oldest press in Orissa, has sent forth a stream of civilizing literature. In addition to this press, the Mission maintains an English High school affiliated to the Calcutta University, an European High school, and an orphanage for boys and girls. There are in all 8 missionaries and 5 evangelists attached to the Mission in this district.

The Roman Catholic Mission has been established in the town of Cuttack since 1845, and has a congregation of about 400 Roman Catholics, nearly one half of whom are Europeans or Eurasians, the remainder being natives, chiefly immigrants from the Madras Presidency. The Mission has a convent, a chapel and a church the latter, which has accommodation for 200 worshippers, was built in 1858-59. It also maintains an orphanage for children of all classes, which was founded in 1880 and contains 60 inmates. The latter are under the direction* of 5 sisters sent out by the Congregation of the Sisters of St. Joseph; the priests of the Mission are sent to India by the Congregation of the Missionaries of Saint Francis of Sales.

*Hindu
sects.

Vaishnavism is predominant among the common people of this district, and the causes of this predominance are not far to seek. The existence of the temple of Jagannāth, who is regarded as the incarnation of Vishnu, has exerted a powerful influence on the popular faith; and besides this the famous reformer Chaitanya passed an important part of his life in these parts, and made a lasting impression upon the popular mind by the purity of his life and teachings. Vaishnavism is still struggling to divert the popular mind from the number of gross animistic accretions by which the religion of the mass of the population is encumbered; and it is Vaishnavism which mainly distinguishes the semi-Hinduized aborigines in the plains of Orissa from their Animistic brethren in the hills, though its adoption is merely nominal and its high ethical principles do not shape the moral conduct of the people. Genuine Oriyās belonging to sects other than that of the Vaishnavas are very few in number. Śaktas, the followers of Sakti or the Goddess Durgā or Kālī, are to be found among the Brāhmins and Kshatriyas of the district and among the Bengal immigrants. The only other two sects represented, the Saivas and Gāṇapatyas or followers of Ganapati, bear a very small ratio to the total Hindu population. The Parwārs of Rajputāna, who are Jains, have a temple consecrated to the worship of Parasnāth at Chaudhri-bazar in the heart of Cuttack town.

Religious
life.

The religion of the people exhibits very clearly the blending of Hinduism with Animism, and the process of assimilation appears to be illustrated by the common legend of Jagannāth.* Here we find the aboriginal people worshipping a blue stone in the depths of the jungle, until the deity grows tired of the jungle offerings of the primitive people and longs for the cooked food of the more civilized Aryan race. When the Aryan element at

* See Sir W. W. Hunter's Orissa, Vol. I, pp. 88-95.

length comes on the scene, the rude blue stone disappears and gives place to a carved image. At the present time this twofold worship co-exists throughout Orissa. The common people have their shapeless stone or block which they adore with simple rites in the open air; while side by side with it is a temple to one of the Aryan gods with its carved image and elaborate rites. Every village pays homage to the Grām Devatī* or Thakurāni, as these stones and stocks are called, and reverence her as the tutelary goddess of their small community.

The goddess is commonly represented by a piece of shapeless stone, smeared with vermilion and surrounded by several smaller pieces of stone, also vermilion-daubed and shapeless, which represent her children. Carved images are sometimes, though rarely, met with, and occasionally the trunk of some tree, supposed to possess supernatural properties, is smeared with vermilion and worshipped as the village goddess. Besides the generic name Grām Devatī, each goddess has a separate specific name, which is commonly one of the thousand names of the goddess Kālī. The general idea seems to be that she is like a mischievous old witch; and earthen figures of horses, elephants and other animals are placed before her by the superstitious rustics, as it is believed that she wanders about at night.

The most noticeable feature of the Grām Devatī worship is the non-priestly caste of the men who conduct it, the Bhandāri, Li, Rāul or Bhopā being usually the priest. They hold small tax-free grants called "*māfi Grām Devatī*," i.e., lands which were set apart for her worship at the time of the first regular settlement; and they also receive daily doles from the rich men of the village and weekly doles from the poorer people: the latter are given on Thursday, commonly regarded as Lakshmi day, or the day of the goddess of fortune, which is considered a specially auspicious day for the regular *pūjā* of the Grām Devatī. The first essential in this worship is a bath which keeps the Thakurāni cool and well disposed towards the village. The bath includes smearing with *ghī* and turmeric; when it is completed a paint of vermilion is put on, and after the toilet is over a light oblation (*bhog*) of fruits and other sweetmeats is offered. The daily *pūjā*, including both bath and *bhog*, costs about an anna, and if this small daily expenditure cannot be met, the priest contents himself by pouring a little water over the goddess, though sometimes even this inexpensive offering is dispensed with. The

* For a fuller account see Note on the Grām Devatī or Tutelary Village Deity of Orissa by Bābu Jāmini Mohan Dās, J. A. S. B., Vol. LXXII, Part III, No. 2, 1903.

worship of the Grām Devatī is conducted with great pomp and ceremony on the Mahāstamī or second day of the Durgā Pūjā, and special offerings of sweetmeats and fruits are made on all festive occasions. The Thākuraṇī, who is supposed to possess more powers for doing or averting mischief than for doing positive good, receives special attention on the outbreak of any epidemic disease. Within her own village she is believed not to commit any mischief, and epidemics are supposed to be the work of neighbouring goddesses, whom the tutelary village goddess expels by persuasion or superior force, if she is duly propitiated. The occurrence of a single case of cholera in the village is the signal for "Thākuraṇī Mārjanā" or washing of the Thākuraṇī. The villagers immediately raise the necessary funds by subscription, and propitiate the goddess by a cooling bath and refreshing offerings, the ceremony being repeated, if the epidemic does not cease.

The people have a peculiar means of knowing the wishes and decrees of the goddess. In almost every village there is a male or female medium, called Kālasi, through whom the goddess communicates with the people. The presentation of a betel-nut is the token of engaging the Kālasi, whose services are specially in demand on the occasion of an outbreak of cholera. Before the time appointed for the Mārjanā, he takes a purifying bath, puts on a new cloth, and paints his forehead with vermilion. Then holding two canes in his hands, he appears before the Grām Devatī, and with dishevelled hair swings his body to and fro. After a time he begins to tremble, and in the course of his confused mutterings gives out some secrets of the village to the confidence of the people. He then predicts evil to some and good to others, prescribing at the same time the remedies required, which take the shape of offerings to the goddess and special favours to himself. While going through these antics the Kālasi is sometimes offered a fowl, the blood of which he drinks after pulling off the head.

Certain village goddesses are regarded as "Parama Vaishnavis" or devoted followers of Vishnu, and animal sacrifices are not allowed before them. Probably owing to the spread of Vaishnavism, such sacrifices are only made sparingly before the other goddesses; but in the Mahastamī pūjā and other special pūjās offered in fulfilment of vows, animals are generally sacrificed. Fowls are also let loose before some of the goddesses by the upper classes of Hindus, and are killed and eaten by the lower classes.

It seems hardly open to question that this worship of the malevolent spirit, through the medium of shapeless stones, is an

offshoot of the fetishism of the aborigines. The fact that all "Hindus" from the highest to the lowest make the Grām Devatī the object of their adoration shows how the beliefs of the whole Hindu community have been permeated by this fetishism. It still includes, though to a restricted extent, the sacrifice of animals, which is one of the most characteristic features of aboriginal worship; and the offering of fowls, which are so vigorously excluded from the houses of the upper classes of Hindus, can hardly be said to be anything else than an aboriginal practice. The restriction of the priestly function to the Sūdra castes is another link in the chain of circumstances which indicate the aboriginal origin of this form of worship. While the Brāhman stood aloof, the mass of the people, leavened in their lower strata by the aborigines, adopted the faith which, by its easy explanation of the origin of evil, appealed most strongly to their simple minds. The Brāhman could not, however, long stand against the popular current which thus set in, and he eventually invented more refined forms of worshipping the same malevolent spirit. The aboriginal mode of village worship seems thus to have preceded the Paurāṇik rites of Sakti worship, although the present names of the goddesses are apparently of later date.

The Oriyā has long had an unenviable reputation as a weak, effeminate and stupid creature, and early writers almost all condemn them. It is said that they "prefer dirt and scarcity of food with idleness to cleanliness and plenty with hard labour," and that "industry and enterprise are as foreign to them as opium-eating and noon-day sleep to the English husbandmen;" and this unfavourable estimation of their character was forcibly expressed by Stirling, who, writing in 1822, says:—"The Oorias as a nation are justly described by Abul Fazl to be very effeminate, that is, they are extremely deficient in manly spirit, their figures are slight and delicate, and the costume of the males has little to distinguish it from that of the females, except the different manner of wearing the cloth fastened about the loins. They are moreover equally ignorant and stupid. Orissa might be termed the Boeotia of India, with reference to the intellectual dullness of its inhabitants as compared with the people of any other province. A striking proof of the estimation in which their capacity has been ever held is the fact that in all ages and under all Governments since the downfall of the Orissan monarchy, the principal official employments throughout the Province have been engrossed by foreigners—by Bengalis north and Telingas south of the Chilka Lake—owing, I really believe, in a great measure to the difficulty of selecting from its indigenous population persons properly

SOCIAL
LIFE.
Character
of the
people.

qualified for trusts of difficulty and importance. The mass of the people are little prone to the commission of crimes of a daring and heinous character, as might be inferred from the feminine spirit above ascribed to them; but they are well versed in all the arts of low cunning, dissimulation and subterfuge, and the love of intrigue forms a prominent feature in their character, however clumsy many of their attempts to mislead or circumvent. In justice however to the bulk of the agricultural population, it must be said that the ryots of Cuttack are extremely industrious though they work with little spirit or intelligence, and altogether the Oorias of the plains, whatever their faults, are certainly the most mild, quiet, inoffensive, and easily managed people in the Company's provinces. They furnish too a valuable class of servants in whom the virtues of fidelity and honesty (according to their own conception of those qualities) are conspicuous."

Experience has proved that the character of the people given by Stirling was written in ignorance of the Oriyā character; he was too honest to misrepresent, too just to be prejudiced against them, but coming in contact only with those who under excited passions were engaged in law-suits, he did not know the people. It is true that they are ignorant, superstitious and priest-ridden, and have less natural acuteness than the Bengalis. But they are less prone to litigiousness and deceit, they evince more gratitude for kindness, and they are more impatient under ill-usage. They have proved themselves to possess great aptitude for public business, and their uprightness in offices of much responsibility and beset with very great temptation has placed them in the first rank of our native subjects for trustworthiness and honesty. To this it should be added that the Oriyā bearers are industrious, sober, faithful and trustworthy, and that they will follow a kind master to all parts of India. On the other hand, it is true that the labouring classes and the lower castes of cultivators are somewhat dull-witted, but it is doubtful if the Bihāri peasant or the Bengali ryot is mentally the superior of the Oriyā. Among the more educated classes the Brāhmans are obstinate and bigoted, but they are of a refined and intellectual type; and the writer caste, of Karans, or as they are called locally the Mahāntis, have as high a reputation for acuteness as the Kayasths of Bihār. The old reproach of unfitness for Government employment can no longer be levelled against them. The pure foreign element has almost disappeared from among the ministerial establishment; and even the domiciled Bengali who has adopted the country as his own is losing ground before the advancing native of Orissa. Young Oriyā graduates passing out of the Ravenshaw

College at Cuttack are also entering the Subordinate Executive Service; and at the present rate of recruitment, there will in a short time be a staff of Oriyā officers sufficient for the requirements of the whole Division. Generally speaking, the people are kindly and good humoured, easily controlled and remarkably law-abiding; they are given only to committing the pettiest of crimes, and in many ways recall the old idea of the mild Hindu. Outside Orissa they have a reputation for good work as domestic servants, chaprāsīs and coolies; and their readiness to migrate and find employment as carpenters, punkah-pullers, *pālki*-bearers, and in other kinds of labour requiring physical rather than mental capacity seems to show that they are not altogether sunk in the stagnation which earlier writers have attributed to them. Even, however, among the literate classes there is a want of enterprise, slowness, and hopeless conservatism which are in marked contrast to the versatility of their Bengali cousins; and an inborn love of ease and dislike of hard work appears to permeate all classes.

In justice, however, to the Oriyās it should be remembered that for ages they have been a conquered nation, and that within the last few centuries they suffered at the hands first of the Mughals and then of Marāthā conquerors. From the end of the 17th century they were continually harried and oppressed; under the Mughal Emperors a greedy and generally disloyal Deputy wrung from the Province an uncertain revenue; the wretched peasantry were ground down beneath a military occupation; and a rapid succession of rifle soldiers harried the country and got together as much plunder as they could wring from the people. But miserable as the lot of the Oriyā had been under the Mughals, it was worse under the Marāthās. The misrule of these marauders presents a dismal scene of extortion, desolation and rapine; their cavalry harried the country at stated periods each year; and to quote Stirling's account, "their administration was fatal to the welfare of the people and the prosperity of the country, and exhibits a picture of misrule, anarchy, weakness, rapacity and violence combined, which makes one wonder how society can have kept together under so calamitous a tyranny." Fixed property did not exist; the people fled to the swamps and forests as an asylum from the Marāthā spearmen; and the land remaining untilled, the horrors of famine were added to the general misery. It would have been strange if the Oriyā character had not been affected by this grinding tyranny; and it is not surprising that the bitter experience of their forefathers should have discouraged thrift, promoted improvidence and tended to make the people a feeble and timid race.

There is, however, another influence at work which accounts very largely for their want of spirit and enterprise. From time immemorial they have been a priest-ridden race, kept in subjection by the Brāhmans and subject to all the paralyzing influences of religious superstition and caste prejudice. Nowhere else do the ancient caste* rules exercise such an influence. Men following precisely the same occupation are sometimes separated by so vast a social gulf that the slightest bodily contact with each other brings pollution; and the highest cannot touch any article that the lower has handled until it undergoes purification. Not only had the Brāhman the monopoly of education, but no one outside the priestly caste might plant even a cocoanut-tree. These profitable trees were only planted by non-Brahmanical hands after the advent of the missionaries, and the native Christian who had been the first to break the immemorial custom was regarded for many years as a man lying under the wrath of the gods. Even in more recent times, a Government official, who imagined that he would increase the revenue by planting cocoanut-trees along the Māchgaon canal, found, when the time came to sell the fruit, that the Brāhmans had forbidden any Hindu to purchase the nuts and was at last driven to get the best price he could from the native Christians in Cuttack. An equally striking instance of the strength of caste prejudice is the existence of the caste called Chhatra-khai, which is made up of the people who lost their caste in 1866 for eating in relief-kitchens (*chhatra*). The caste is divided into an upper and a lower sub-caste—the former comprising Brāhmans, Karans, Khandaits and Gop-Goālās, the latter consisting of the castes ranking below these in the social scale. Members of each sub-caste marry within that group, irrespective of the caste to which they originally belonged; but no intermarriage is possible between members of the two sub-castes.

PRINCIPAL
CASTES.
Khandaits.

The Khandaits are by far the largest caste in the district, numbering, according to the census returns of 1901, over 375,000, or more than a sixth of the entire population. Besides contributing the largest share to the district population, the Khandaits have strong claims to be regarded as the most interesting caste in the district; and Cuttack may be aptly termed the land of the Khandaits, just as Puri is the district of the Chāsa caste. There is some difference of opinion as to the origin of the word Khandait. The general view is that it means swordsman (from *khandā*, a sword), but another explanation which has been put forward, and with much plausibility, is that Orissa was formerly divided into

* See Orissa by Sir W. W. Hunter, Vol. ii, pp. 139–141.

khandas, or groups of villages corresponding to the *pargana* of Muhammadan times, and that there was over each a headman called *khandapati*, which was subsequently corrupted to Khandait. Whatever may be the etymology* of the name, it is admitted that the Khandaits are the descendants of the people who formed the peasant militia under the ancient Rājās of Orissa. The armies of these chieftains consisted of various castes and races, the upper ranks being officered by men of good Aryan descent, while the lower ranks were recruited from the low castes alike of the hills and plains. As members of the militia, the Khandaits had to serve as soldiers in time of war, and in return they were given lands to hold under a strictly military tenure. Their characteristic occupation and the consequent relation with land all tended to alienate them from the communities to which they had originally belonged, and eventually led, on the establishment of a well-defined caste system, to the formation of the Khandait caste.

The different variety which these people exhibit and their free intercourse with some other castes tend to show that the Khandaits cannot trace their descent from a single origin and that the caste is only a heterogeneous group, which is perhaps made up at the one end of Aryan immigrants and at the other of recruits from a number of indigenous non-Aryan tribes. They are divided into two sub-castes—(i) The Mahānaik Khandaits and (ii) the ordinary Khandaits. The latter, who occupy the position of ordinary cultivators, appear to correspond to the rank and file of the old feudal militia, while the former, who hold large *jāgir* tenures, may represent the officers of that body; an almost impassable gulf seems to exist between these two sub-castes, and there is nothing common between the two, except the name itself. On the other hand, cases of intermarriage between the Khandaits and members of other castes of equal standing are not at all rare. Karans, a fairly high caste of Aryan descent, are often found marrying members of Mahānaik Khandait families, and intermarriage between the Chāsas, who, as stated below, have an admixture of aboriginal blood, and the ordinary Khandaits is quite a common occurrence. The characteristic occupation of the Khandaits no longer existing, free intercourse has now sprung up between them and the Chāsas, and there is hardly anything at present to distinguish members of the two castes.

* In the Bengal Census Report of 1901 (p. 389) it is stated that "it is a significant fact that one of the caste *Santaks*, or devices endorsed on documents, is a *kānda* or arrow." It is stated, however, by Babu Jamini Mohan Das that the only caste which is known to use the *kānda* as a *Santak* is the low unclean caste of the Kandraas. The Khandait *Santak* is a *katāri* or dagger.

Although the Khandaits nowhere number less than 10 per cent. of the population, the inequality of their distribution is very marked. Whereas in Cuttack thāna they contribute only a tenth to the population, in the thāna of Aul or Rājābari there are, in every hundred, no less than 28 Khandaits; the other thānas where the Khandait population exceeds the district average considerably are Patāmundai, Kendrāpara and Tirtol. The distribution of this caste appears to correspond with the limits of the territories of the ancient feudatory Rājās of Orissa. It was their peasant militia which, as already stated, ultimately became the Khandait caste, and it is not surprising therefore that the Khandaits are found in largest numbers in those parts of the district which at one time formed the fiefs of the feudatory chiefs or in the adjoining tracts. Aul, Patāmundai and Tirtol were for centuries under the influence of native chiefs, and the Rājās of Kujang, Kanikā and Aul long exercised considerable power in the south-eastern and north-eastern parts of the district. The part of the district where the population of this caste falls considerably below the average is that included in the Cuttack thāna and its immediate neighbourhood. This tract was the chief portion of the Mughalbandi, or crown lands, as opposed to the military fiefs of the hill-country to the west and of the river jungles and marshes to the east.

Chāsas.

The Chāsas, with a strength of nearly 266,000 persons, are next to the Khandaits the most numerous caste in the district. They are known to be recruited mainly from various aboriginal tribes, and the process of accretion seems to be still going on. As their name implies, they are an agricultural caste, the members of which almost all hold land as occupancy ryots or work for others as field-labourers. Like the Khandaits, they are the well-to-do peasantry of the villages, and are among the most skilful of all the Oriyā cultivators. Their distribution appears to be governed by the hereditary occupation of the caste, as they congregate most thickly in the fertile deltaic plains and on least numerous on the west, where there is a rocky fringe of hills and sterile uplands, and on the extreme east, where there are marshy jungles quite unfit for the plough. The thānas of Cuttack, Sālipur, Tirtol and Jagatsinghpur, lying between the hills on the west and the swamps on the east, are the parts best adapted for cultivation; and these naturally are the thānas in which the Chāsas are mostly to be found. They are divided into four sects, the Orh, Benātiyā, Chukuliyā and Sukuliyā, of which the Benātiyā stands first in rank, and the Sukuliyā and Chukuliyā lowest; there is no material difference between the latter, except that the

Sukuliyaś do not allow their females to appear in public. In this district a Beṇātiya may intermarry with the other sub-castes on payment of a fine to his *pañchāyat*, and all the sub-castes may drink and smoke, but may not eat cooked rice together. The Orh Chāsas, it is said, were the first of the aboriginal tribes who settled in Orissa and began to cultivate the soil; and they allege that, as they were very numerous, the country was called after them. The Beṇātiya is said to have been created from a tuft of *beṇā* grass, or to be descended from the early settlers who first made the land fit for cultivation by clearing the *beṇā* grass away.

The Brāhmanas, though constituting by far the most powerful Brāhman caste in Cuttaek, are not nearly so numerous as the two castes mentioned above, as at the census of 1901 they amounted to only 194,692 persons. They belong to the Utkal class of Brāhmanas, which is one of the five great territorial groups into which the Gaura Brāhmanas of Northern India are divided. Antiquarian research has not yet been able to fix the time when this division took place, but it may perhaps be assumed that the colonies of Aryan Brāhmanas were separated by local usage, and that this separation was marked by geographical limits before the wave of Buddhism passed over the Utkal country. Buddhism deprived the Brāhmanas of their priestly functions and drove them to more worldly pursuits for their subsistence. Most of them resorted to agriculture, while a few are believed to have taken service as cooks in the temple of Jagannāth. In the 5th century A.D., the ruling dynasty revived the Brahmanical faith in Orissa, not by restoring the priestly functions to the degraded Brāhmanas who, forsaking the Vedas, had turned cultivators and cooks, but by importing 10,000 Brāhmanas of pure faith, fit to perform Vedic rites, from Kanauj, the greatest stronghold of Hinduism in Northern India. Tradition relates that these Brāhmanas performed 10 great "horse-flesh sacrifices" (*Asvamedha Jajna*) on the bank of the sacred Baitarani near the town of Jājpur, and a flight of steps, called Dasāsvamedha Ghāt, yet marks the spot near which the sacrifices were performed. These imported Brāhmanas gradually spread over the whole of Orissa, and the colonies which they formed with the aid of royal grants of rent-free lands are still known as *Sāsana*.

In course of time, however, the process which caused the original division of the Gaura Brāhmanas into five groups was repeated, and two endogamous sub-divisions were formed on the two sides of the river Brāhmani, the northern sub-division being called Jājpurōtriya and the southern Dakshinōtriya. Jājpur or Birajā Kshetra is the centre of the former and still contains the largest proportion of Brāhmanas in the district. Puri is the centre of the

latter, though colonies of Dakshinotriya Brāhman have crossed the boundary since the cleavage and settled in the northern region. Throughout Orissa, Brāhman taboo wine, but those who worship the goddess Kālī are permitted to drink it, and the temple of the great goddess Birajā at Jājpūr probably became a centre for the spread of this objectionable habit. This seems to be the only feasible explanation of the legend that the water of the sacred Baitarani became wine and that the Jājpūr Brāhman degraded themselves by drinking it; and it is noticeable that the southern Brāhman give this as a reason for considering the northern Brāhman inferior to themselves.

It must have been increasingly difficult for a growing community to keep strictly within the limits of the religious duties prescribed by the Sāstras; and a further split was, therefore, caused between those in the enjoyment of royal patronage who continued to observe them, and those whom necessity forced to depart from them. Each territorial sub-division has thus been divided into two groups called Srotriya or Vaidik and Asrotriya or non-Vaidik. The former includes the Sāsani Brāhman who depend, for their subsistence, chiefly on royal grants of rent-free lands, and the latter includes the following classes:—(1) Sārūa or Paniari, growers and sellers of vegetables; (2) Pāndā, Pūjāri or Deuliā, professional temple worshippers or cooks; and (3) Marhia, priests of low castes, who receive alms from the humble clients whom they serve and enjoy the notoriety of being fed first in all feasts connected with *prāyaschitta* or purification ceremonies. The Srotriyas do not intermarry with the Asrotriyas, and the latter have no intercourse with the degraded Māstāns or Mahāstāns of the pre-Buddhist period. The non-Brahmanical occupations and titles of the latter mark them out as a class quite distinct from the rest of the Brāhman of Orissa; they are called Balarāmgotrī, apparently from the fact that the plough is believed to be the distinctive weapon of the god Balarām.

The Utkal Brāhman were originally all Śāktas, but now they all keep the *sālgṛām* and worship the four gods Vishnu, Siva, Ganesh, and Sūrya, and the goddess Durgā. Chaitanya converted some of the Brāhman to Vaishnavism, but even these converts worship the four gods and the goddess mentioned above on ceremonial occasions. The Grām Devatī receives the same degree of homage from this caste as she does from the other castes in Orissa. The ten *sanskāras* or purifying ceremonies are a distinctive feature in the life of the Utkal Brāhman. According to the Sāstras, they should be performed at different periods of life, but in Orissa all the ceremonies are performed at the time of

upanayana or assumption of the sacred thread. The Utkal Brāhmins observe most rigidly the limits of age laid down in the Sāstras for the marriage of girls, giving them in marriage usually before ten and seldom after twelve, unlike the other high castes, the Kshattriyas, Karans and Khandaits, whose daughters are rarely married before twelve and are sometimes kept unmarried up to what is regarded as an advanced age even among educated reformers.

The Utkal Brāhmins have *gotras* indicative of descent from old *rishis*, like the other Brāhmins of Northern India. The *gotra* groups are all exogamous, and some of them have been further broken up by titles indicating descent from more recent ancestors. Below this again, there are still more sub-divisions leading to a system of hypergamy, which, however, is far less marked in Orissa than in Bengal. In this connection, mention may be made of the remarkable fact that among the Utkal Brāhmins traces are found of the existence of the totemistic beliefs common among the Dravidian races. A Brāhmin of the Atreya *gotra* for instance will not sit on the skin of the deer or eat its flesh. A Brāhmin of the Kaundinya *gotra* similarly does not sit on the skin of a tiger, and a Brāhmin of the Gautama *gotra* offers special *pūjā* to the cow on the occasion of marriage. The usage is explained, not by any direct descent from the animals revered, but by the legend that the *gotra rishis* who were invited to the *yajña* of Daksha fled in the disguise of animals when the *yajña* was broken up by Siva. This is no doubt a fiction invented to explain an aboriginal belief, which the Brāhmins apparently imbibed from the Dravidians with whom they came in contact. There is, however, no evidence that there was any actual infusion of Dravidian blood among the pure Aryans who were imported from Kanauj.

The Gauras, who number 139,587, are the great pastoral caste Gauras. of Orissa, corresponding to the Goālās in Bengal and Bihār. They nearly all possess cattle and are chiefly engaged in breeding cows and in selling milk, curd and *ghi*; about 25 per cent. are also engaged in agriculture, and some serve as *mulyās* or hired agricultural labourers. They also work as domestic servants and very largely follow the profession of *pālki*-bearers. There are several sub-castes, of which the Mathurāpurī ranks highest; in Balasore its members do not carry the *pālki*, but in Cuttack all Gauras will do so. The Gopapurī sub-caste is noticeable for the fact that its female members are almost the only women in Orissa who do not wear nose ornaments—a circumstance which, they pretend, connects them with Krishna's mythical milkmaids. The young women of both sub-castes prepare the butter and *ghi* which the

elder ones take round for sale with their milk. Field labour of all kinds is eschewed by the Gaura women. The sub-caste known as Magadha ranks last, and is probably a recent accretion from some aboriginal tribe.

Pāns.

The only other caste numbering more than 100,000 is that of the Pāns (103,205). They seem to have belonged originally to the aboriginal tribes, and are consequently found in large numbers in the western thānas of the district, Sālipur, Jāipur, and Dharmshāla, which are close to the Garjāt hills. The social status of the caste is very low; they eat pork and fowls, drink wine, and repudiate the Hindu restrictions upon food. Their original occupation is said to be weaving, but they now mostly work as day-labourers, drummers and cane-weavers, and many of them have taken to cultivation. Their professed religion is a sort of bastard Hinduism, which in Cuttack inclines to Vaishnavism, each group of Pāns having their Pān Vaishnava who officiates as their priest. The veneer of Hinduism, however, has only recently been laid on, and beneath it may be perceived plentiful traces of the primitive Animism common to all Dravidian tribes.

CHAPTER IV.

PUBLIC HEALTH.

A COMPARISON of vital statistics for any lengthy periods is rendered impossible by the changes in the system of registering births and deaths which have taken place from time to time. In 1869 the duty of reporting deaths was imposed on the village *chaukidars*, and in 1876 the system was extended to births; but the returns received were so incomplete that they were soon discontinued, and, except in towns, deaths alone were registered until 1892, when the collection of statistics of births as well as of deaths was ordered, and the system now in vogue was introduced.

The returns submitted since that year up to the end of 1904 show that there has been a substantial increase in the population. During the nine years ending in 1900 the reported births exceeded the deaths by more than 108,000; and the excess would probably have been still greater had the figures been available for 1891, which was a particularly healthy year. Even, however, if we take the average of the next nine years to represent the number of births in 1891, the aggregate of births from 1891 to 1900 would be 726,060; or 37·47 per cent. of the population of 1891. The number of deaths in the same period was 591,000, which gives a percentage of 30·50 on the population of 1891; and the excess of births over deaths was thus 6·97 per cent.,—a result which closely approximates to that obtained at the census. The corresponding percentage for the whole Province of Bengal (4·44) was considerably lower. During these ten years the death-rate only twice exceeded the birth-rate, once in 1892 and again in 1894. In the first year, when the death-rate was over 38 per mille, epidemics of cholera caused an unusually heavy mortality (10·98 per mille), and in 1894 the high death-rate of 35·13 per mille was due, in a great measure, to the bad crops in the preceding year and to the high price of food-grains. The people being scantily nourished, their weakened constitutions were less capable of withstanding the inroads of disease, while their distress aggravated by the high floods of July, which forced the poorer classes in the affected tracts to supplement their scanty meals

of rice-by jungle products. In these circumstances, it is perhaps not surprising that the death-rate due to fever was 19·3 per mille, the highest recorded in this district. After this year there was a steady decrease in the death-rate till 1897, when there was again severe scarcity. The distress which the people suffered in consequence of the failure of the crops is clearly reflected both in the mortuary returns and in the birth-rate. The mortality at once rose from 27·16 to 83·39 per mille in 1898, and then in the following year dropped suddenly to the lowest ratio recorded (23·75); while the birth-rate fell from 43·21 to 36·74 in 1898, after which it rose to the highest figure yet reached, the number of births reported in 1899 representing a ratio of nearly 50 per 1,000.

The vital statistics since 1900 show that the health of the people has been good, except in 1901, when there were outbreaks of cholera and small-pox, which caused a large mortality and resulted in a slight excess in the number of deaths over the births. Since that year the birth-rate has steadily mounted, reaching the high figure of 43·28 per thousand of the population in 1904, while on the other hand the death-rate has fallen to 28·30,—a ratio considerably below the Provincial average of 32·45. The railway has contributed largely to this satisfactory result, one of the greatest immediate benefits it has conferred being the comparative immunity which the district has secured from the dissemination of epidemic disease by the crowds of pilgrims travelling to and from the temple of Jagannāth at Puri, who now go by rail instead of on foot.

PRINCIPAL DISEASES.
Fever.

According to the returns, by far the greatest number of deaths are due to fever, about one-half of the total mortality being ascribed to this cause. Here, however, as elsewhere, this is due mainly to the difficulty of diagnosing all but a few well-defined diseases. The village *chaukidār*, who is responsible for the returns, is far from being a medical expert; he knows cholera, dysentery and small-pox, but most other complaints he classes indiscriminately as fever. It is impossible therefore to say what proportion of the total is attributable to malarial affections, though generally it may safely be assumed that wherever the mortality entered under this head is unusually high, the greater part of the excess over the normal is due to their prevalence. According to this criterion, malarial fever is not very common in Cuttack, as the proportion of the deaths shown as due to fever is relatively small in comparison with other parts of Bengal. During all the years for which mortuary returns are available, the death-rate has never reached 20 per mille; the average for the 5 years ending in 1903 was

only 14·52 as compared with the mean ratio of 22·32 for the whole of Bengal; and in 1904 it was as low as 13·50, or nearly 9 per mille less than the Provincial average. Fever is most prevalent after the close of the rains when the water is gradually draining off the fields, but it visits almost every homestead at one time or other during the year; and even in such a healthy year as 1904 it is reported that no villages were immune throughout the year, though a few may have remained so for a few months at a time.

The district has always been exceptionally liable to outbreaks of cholera, particularly before the opening of the railway, when it was either introduced or spread in the district by the pilgrims bound to and from the temple of Jagannāth. Writing in 1875 Sir W. W. Hunter says:—"The arrival of the pilgrim stream is, year after year, the signal for the ordinary sporadic cases to assume the dimensions of an epidemic. Cuttack, the capital of Orissa, suffered so regularly and so severely from the passage of the pilgrim army that the doctors having tried everything else, at last determined to shut the devotees entirely out of the city. The result upon the public health has been marvellous. Police are stationed at the entrance to the town, and warn the pilgrims that they must skirt round the municipal boundaries. A sanitary cordon is thus maintained, and Cuttack is now free from the annual calamity to which it was for centuries subject."

Whatever may have been the effect of these precautionary measures in protecting the town of Cuttack, the district generally continued to suffer year after year from cholera, and the outbreaks were as frequent, widespread and severe as before. The decade ending in 1891 was particularly bad in this respect. In 1882 it was reported that the virulence and fatality of the disease was greater in Orissa than in any other part of Bengal, and it was worse in Cuttack than elsewhere in Orissa. The next year was also a bad cholera year, especially in the littoral-thānas. In 1885 the mortality from cholera rose in the Dharmshāla thāna to 10·94, and in Aul to 10·71 per thousand, the disease having spread all over the district from the Patāmundai thāna, where the water-supply had been contaminated by the sea water brought in by the cyclone-wave, and by the numerous corpses of men and animals putrifying in it. Next year the death-rate again exceeded 8 per mille in these two thānas and in Aul; but the worst year in Cuttack, as in the rest of Orissa, was 1889, the cholera mortality ranging from 8·90 in Dharmshāla to 22·19 in Bānki.

Throughout the next 10 years cholera was seldom absent, but it assumed serious proportions only in 1892, when it accounted

History of
epidemics.

for 21,289 deaths, and in 1900, when the mortality was at the rate of 8·46 per 1,000. In 1892 the high death-rate was due to the long-continued drought which followed the cyclone of November 1891. The sea-wave which accompanied this cyclone rendered the water more or less brackish all along the sea-coast, and the drought aggravated this. The winter rice crop was moreover seriously damaged by the cyclone, and the *rabi* crop suffering from the subsequent drought, the people were obliged to take unwholesome food. Again in 1900 the evil effects of the early cessation of the rains of 1899, which were greatly intensified by the absence of spring rain in 1900, and the late commencement of the monsoon, brought about conditions favourable to cholera, and caused a mortality which was exceeded in only two other districts. Since that year there have been serious epidemics in 1901 and in 1903, the prevalence of the disease in these years being apparently due to the short rainfall which led to the pollution of the drinking water supply. In 1904 the death-rate from cholera was the lowest ever recorded (0·37 per mille).

Causes of
its preva-
lence.

As regards the unusual prevalence of cholera in this district, reference has already been made to the pilgrims travelling to and from Puri as one of the main causes of the epidemics. After a long journey, during which they suffered many privations and hardships, the pilgrims arrived at their destination in an exhausted condition, only to suffer more hardships among the enormous crowds of people already assembled there. It will easily be imagined that the soil, atmosphere and water-supply soon became polluted, and that a combination of these circumstances told unfavourably on the health of the people, especially on those whose systems had already been lowered by a long and fatiguing journey and by deficient and bad food, and rendered them more liable to cholera. This they distributed in all directions on their return journey, principally by polluting with the germs of the disease the water-supply of the places at which they halted *en route*. In this way, cholera was introduced or spread in most of the localities which the pilgrims passed on their journey, and the disease finding a soil rendered congenial by a scanty rainfall and an impure water-supply, increased rapidly. On the other hand, the way in which cholera has almost invariably appeared as a consequence of deficient rainfall is very noticeable. In 1840 the rains ceased on the 24th September, and a terrible scourge of cholera followed which scarcely spared a single family. In 1883, 1885 and 1888 there was little or no rain in October or November, and the records of cholera shew that 7,482, 7,140 and 14,887 deaths occurred during the next seasons. The system of registration is no

doubt more accurate than it formerly was, and this may account for the terrible figures of subsequent years, such as 1892, when there were 21,000 deaths; but the outbreaks were far too simultaneous and widespread and occurred at too great a distance from the pilgrim route to admit of the explanation that they were solely due to the passage of pilgrims. In more recent years, again, epidemics of cholera have been most severe when the district has suffered from late or short rainfall; and they are especially virulent when the winter crop is imperilled by drought in October, as in their eagerness to save the rice the ryots use every available drop of water for irrigation, with the result that by February there is little left for drinking purposes.

Small-pox has hitherto been almost an annual visitation, Small-pox. nearly as terrible in its effects as cholera; and Cuttack, like the other districts of Orissa, has long had an unenviable reputation for the frequency of its epidemics. Year after year the disease breaks out and causes a heavy mortality, though there is no doubt that a large number of the deaths are preventible. Inoculation is carried on through the district, and the disease is thus spread. When the outbreak of small-pox is mild in character, children of 5 to 10 years of age are wilfully exposed to the disease; and on returning to their own villages an outbreak results, which is not confined to those thus exposed, but spreads amongst the unprotected generally with disastrous results. A fuller account of the widespread practice of inoculation is given below, and it will suffice here to quote a description* given 30 years ago, which in some respects applies equally to the state of affairs existing at the present day. "Small-pox," it is said, "generally makes its appearance about the beginning of the year, and as a rule ends before the middle of April. The Civil Surgeon states that its regular appearance during these months is owing to the practice of inoculating with small-pox matter. The inoculators preserve the virus in cotton, and commence operations about the end of December or beginning of January. Small-pox thus spreads to the unprotected, and becomes general throughout the district. The Oriyās are perfectly regardless of contagion; and it is no uncommon sight to see people in the streets, or walking about the crowded market places, covered with the disease. Ancient prejudice stands in the way of vaccination, and even the more enlightened natives of Orissa will seldom allow their children to be touched with vaccine matter." The opposition to vaccination and the popularity of inoculation are still extremely great; and in

* Statistical Account of Bengal, Vol. XVIII, p. 235.

these circumstances it is not altogether surprising that in the three years ending in 1901, the average annual death-rate from small-pox was over 3 per mille. Since that year, however, the deaths from small-pox have largely decreased, and were only 701 in 1903 and 289 in 1904, as compared with 2,902 in 1902 and 7,253 in 1901; this result being attributed to the action taken against professional inoculators, of whom there were found to be 264 in the district.

Dysentery
and
diarrhœa.

Dysentery and diarrhœa are unusually prevalent in Cuttack, and are responsible for a great number of deaths every year. In the 5 years ending in 1903, the mean ratio of mortality from this cause was 3·37 per thousand of the population, or more than five times as great as the Provincial average (·75); and though in 1904 the mortality was slightly less, only 3 other districts in Bengal returned a higher death-rate. The prevalence of this disease appears to be due to several general causes, such as neglect of the ordinary laws of hygiene, living in damp unventilated houses, exposure to the exhalations from decomposing organic or fœcal matter, chills and variations of climate, direct irritation of the intestines by indigestible food, and last, but not least, bad water and bad air.

Other
diseases.

There have been a few sporadic cases of plague since 1900, but the disease has never obtained any footing in the district, and up to the end of 1904 there have been only 109 deaths. Elephantiasis and hydrocele are extremely common. Statistics shewing what proportion of the population are affected are not available, but investigations made in 1902 among newly-admitted prisoners in the jail indicate how widespread these diseases are. Out of 1,194 prisoners examined 2·68 per cent. were found to be suffering from some form of elephantiasis, half of them having elephantiasis of the legs. Microscopical examination of the blood of 200 of the prisoners who were free from any form of elephantiasis shewed that filarias were present in 26 per cent. of the cases, and these filarias presented the character of the *filaria nocturna*. Altogether 270 of the 1,194 prisoners examined had hydrocele, and 25 out of each 100 suffering from hydrocele harboured the *filaria nocturna* in their systems. This number so closely approximates the 26 per cent. of the general body of the prisoners as to shew that, whatever might be the cause of the extraordinary prevalence of hydrocele, the *filaria nocturna* was not responsible.

Infirm-
ities.

In spite of the prevalence of small-pox, which often results in blindness, and in spite of the hot dry climate, glare and dust which are highly prejudicial to eyesight, Cuttack has a comparatively small blind population, the percentage of blind persons

among males being 97 and among females 73 per 100,000. This percentage is, however, much greater than in either Balasore or Puri. Orissa stands high among the localities in which leprosy is prevalent, but the proportion of lepers in Cuttack (153 per 100,000 among males and 44 per 100,000 among females) is distinctly less than in the two adjoining districts. Insanity is relatively rare, as compared with Bengal proper, and the proportion of lunatics per 100,000 of each sex (excluding the inmates of the lunatic asylum) is only 24 males and 11 females.

Outside the municipalities, sanitary efforts have until recently SANITA-
TION. been almost a negligible quantity. Wells have been sunk and tanks cleaned, but there has been no serious attempt to improve the conditions prevailing in the mofussil villages. In the last few years, however, the District Board have been endeavouring to introduce a scheme of village sanitation by cleansing selected villages, in which the lanes are swept and the rubbish is removed. The Chairman, however, remarks:—"The usefulness of the scheme generally is limited by the amount of money that the Board can afford to allot. To effect any widespread improvement, the expenditure would have to be very considerable. The people are wedded to dirty ways, and expenditure on sanitation in a single year will not inculcate a spirit of cleanliness in a particular village. To keep a village clean and inculcate such a spirit, it will be necessary to continue spending money upon the same village or villages for several years, and thus a very long time must elapse before the advantages of sanitation can be taught and appreciated generally throughout the district." The fact is that the apathy of the people and the unwholesome habits to which they are rooted render the task of village sanitation on any appreciable scale most difficult. The houses throughout the district are built of mud dug up from the vicinity; and the result is that in the neighbourhood of almost every hut or house there is a dirty pit, filled to overflowing with water in the rainy season, and the receptacle of every description of filth. The consequent pollution of the water-supply and the effect on the general health of the villagers can be better imagined than described. In the towns the state of affairs is much better; a system of conservancy is kept up; night-soil and other refuse are removed; and steps are taken to protect the sources of water-supply. As a result of these measures, the health of the people in municipal areas, as shown by the vital statistics, is appreciably better than in the interior; in the year 1904 the town death-rate was more than 5 per mille, and in the previous 5 years nearly 3 per mille lower than that for the whole district. Even so, however, none of the towns possesses

a pure and regular water-supply, and they all abound in filthy pits and hollows containing water of the foulest character and full of decaying vegetation which constitutes a standing menace to public health.

VACCINATION.

Vaccination is unpopular among all classes in Orissa, where the people are more conservative, less enlightened and more wedded to superstitious beliefs than in the neighbouring Province of Bengal. Inoculation has, on the other hand, been practised for ages past, and the people believe in it. They see that its effects are serious, and they think that the powers of the goddess of small-pox are manifested by the eruption; while, as its substitute is not followed by an eruption or, as a rule, by fever, they distrust its powers of protection.

The practice of inoculation.*

The profession of inoculator is hereditary among the Māstān Brāhmans, who also follow the calling of cultivators. They are found in scattered villages all over Orissa, and in this district there are several villages in the Sālipur thāna entirely occupied by them. As inoculators the community and the villages in which they live are well known to the people generally, though the practice of inoculation is naturally most prevalent in the Sālipur police circle. Their working season is usually a short one, extending from about the 1st November to the 1st March. Fees are paid according to the circumstances of the parents whose children are inoculated, and range from a minimum charge of 2 annas for a female and 4 annas for a male child to larger sums, in addition to which presents of cloth, rice, etc., are given. The income of an inoculator formerly is said to have varied from Rs. 100 to Rs. 300, but recently it has fallen and ranges from Rs. 25 to Rs. 200 per annum.

The material used is small-pox derived from a person recovering from an attack of variola discreta and removed on or about the 21st day of the disease: crusts of variola confluenta are not taken by skilful inoculators. After removal the crust is covered up with cotton wool and placed in a small hollow bamboo which is closed with a sola pith cork. When required for use—and this should be, if possible, within 3 or 4 days after removal—the cotton-wool containing the crust is moistened with water and squeezed on to a snail-shell; and the turbid fluid thus obtained is used for the operation. The instrument employed is a small piece of iron, shaped like a miniature country nail-parer, with a sharp edge; with this the skin is notched until blood just appears in the scratch, and the watery fluid mentioned above is

* The following account of inoculation is based on a report written by Major J. T. Calvert, I.M.S., Civil Surgeon, Cuttack.

then applied. Formerly male children were generally inoculated on the forearm, and female children on the upper arm; but the Pāns, the hereditary inoculators of some of the Tributary States, select a spot on the forehead between the eyebrows as the seat of inoculation. Recently, however, owing to the prohibition of the practice, it has been found necessary to select some less conspicuous place, such as the back part of the upper arm or knee, or the back of the hand.

Although there is no restriction regarding the age at which the operation may be performed, it usually takes place between the age of two and eight years, and in practice persons over 40 years of age are not subjected to it.

The operation is practically a religious ceremony. The day before it takes place a solemn offering is made to Sitalā, the goddess of small-pox, of which the essentials are cocoanut, milk, treacle, curd, cheese, plantains, turmeric, rice, *duba* grass, plum leaves and vermilion. This *pūjā* having been completed, the child is inoculated, and incantations are made to Sitalā until the scabs fall off. Four or five days after the operation the inoculator visits the child and takes his fees; and he comes again and offers *pūjā* to Sitalā, from the 9th to the 16th day, during the height of the eruption. Formerly this *pūjā* was performed openly with cornets and drums; but nowadays it takes place privately for fear of attracting attention.

After the operation the child is fed on cold rice and *feni* (a kind of sweetmeat), and has a bath daily until the eruption appears. The bath is then stopped, and rice, *dāl* and fried plantains form the dietary. During the period of convalescence the patient is humoured, dealt gently with, and never scolded, even if fractious, as it is believed that the deity presiding over small-pox is in the child's system, and any castigation or abuse might offend the goddess and draw down her wrath upon the child, in the form of confluent small-pox and death. It is also believed that the inoculators have the power of producing the exact number of eruptions which they promise before undertaking the operation; and they are credited with the power of allaying the intensity of the disease in a small-pox stricken patient. Their treatment consists in the administration of emetics and purgatives, by the action of which they believe the poison is washed away.

Inoculation is thus a regular profession, and the wide prevalence of the practice is sufficiently illustrated by the fact that out of 1,000 prisoners admitted into the Cuttaek Jail in 1902, as many as 303 had been inoculated, 244 had had small-pox, 202 were unprotected, and only 251 had been vaccinated. It is difficult to

put a stop to this mischievous practice, as the villagers are unwilling to come forward and give evidence against the inoculators. Not only, therefore, are convictions difficult to obtain, but until recently the punishments can hardly be said to have been of a deterrent nature, consisting as they did of fines which were easily paid. Of late years, however, a vigorous crusade has been carried on against this abuse, which has rapidly changed matters for the better. In spite of their pitiful protests that their means of livelihood would be taken from them, the inoculators were warned that their practice was prohibited by law and they must give it up, and that if they persisted in it, they would be liable to sentences of imprisonment. Those inoculators who disregarded this warning were prosecuted, and sentenced to various terms of imprisonment; the number of licensed vaccinators was also increased, in order to prevent the excuse that was formerly made that facilities for vaccination were not within the reach of all; notices were issued throughout the district pointing out that inoculation was prohibited; lists of unprotected children were prepared; and personal visits were paid by responsible officers to those localities in which opposition to vaccination was most intense. The result of these measures is seen in the increased number of vaccinations. Ten years ago the average number of successful vaccinations was under 16,000 annually, whereas in 1904 they were nearly 90,000, the average annual number of persons successfully vaccinated during the previous five years being 53,000, or the same as the total number in the four years 1892—96. The ratio of those successfully vaccinated, which averaged 26·74 per thousand of the population in the five years ending in 1903, is now 45·17, or nearly double that percentage; and instead of showing a ratio which was 4·71 lower than that for the whole Province, the district can now claim a percentage which is more than 9 per mille higher than the Provincial average.

MEDICAL
INSTITU-
TIONS.

Thirty years ago there were only two institutions for affording charitable medical relief, besides the lunatic asylum, viz., the Cuttack dispensary or *annachhatra* hospital, and the Jājpur dispensary. The Cuttack dispensary was an institution connected with, or rather forming a part of, a general scheme for giving charitable aid to pilgrims and other poor people, and for supporting a number of *pāndās* or Hindu priests who keep up various temples and shrines in the neighbourhood of Cuttack. The *annachhatra* fund appears to have had its origin in assignments by the successive Hindu, Muhammadan, and Marāthā Governments for religious and charitable purposes; at the time of the first settlement of the district after its conquest, these charitable and

religious assignments were continued as a charge on the revenues of the Province. Owing to the peculiar nature of this charity, less than half of the income was expended in the support of the dispensary proper, a fifth of the income was paid to the *pāndās* or in pensions, and half that amount in feeding the halt, lame, blind, lepers, etc., who assembled twice daily and received substantial meals each time. The female ward was generally filled with starving pilgrims or diseased prostitutes from the town, and the general ward was likewise full of pilgrims some of whom were half famished, while others were brought in the last stages of diarrhoea, dysentery and other wasting diseases. Naturally such an institution failed to attract respectable patients, when nearly all the indoor patients were pilgrims, or starving people picked up on the roads and brought in by the police, and the people of Cuttack, of the ordinary class of hospital patients, would hardly ever enter the hospital. The state of affairs at the Jāipur dispensary was very much the same; the patients were principally mendicants or starving pilgrims, and other classes looked upon the place as polluted and would never remain there.

Medical relief is now afforded at no less than 12 dispensaries, as well as at the General Hospital at Cuttack; and the figures of attendance given in the Appendix will show how completely the old feeling against them has died away. Two of these dispensaries, the Cuttack Municipal Branch and Central Irrigation dispensaries, are in Cuttack town; two at the other sub-divisional head-quarters, Jāipur and Kendrāpara, and the remainder at various places in the interior, viz., at Banki, Dharmshāla, Hukitālā, Jagatsinghpur, Nayā Bazar, Patāmundai, Ganjā and Rājnagar: the two last mentioned are maintained from the funds of the wards' estates at those places. These dispensaries have 34 beds, and in 1904 altogether 92,075 out-patients and 442 in-patients were treated, the number of operations performed being 4,516. A statement of the receipts and expenditure as well as of the principal diseases treated at each of these institutions in that year is given in the tables at the end of this Chapter.

The Cuttack General Hospital, which is the premier medical institution in Orissa, was established in 1874. It took the place of the old *annachhatra* hospital mentioned above, and a considerable portion of its income is derived from the *annachhatra* fund, a grant made by Government in lieu of the old endowment which it resumed; this fund brings in Rs. 3,700 a year after deducting the allowances of *pāndās* and paupers. It contains 58 beds for males and 22 beds for females; the

Cuttack
General
Hospital.

Lady Woodburn Hospital, which was opened in 1905 and which is intended to provide medical relief for respectable native women, forms part of it; and the accommodation for males will be increased when the Medical School has been removed to its new buildings. In 1904 the number of outdoor and indoor patients treated was 21,110 and 1,018 respectively, and 2,376 operations were performed. The great majority of the small minor operations are for the removal of elephantiasis of the scrotum or penis. The chief diseases treated in the out-patient department are diarrhoea, dysentery, malarial fevers, venereal diseases and eye diseases.

Cuttack
Medical
School.

The Cuttack Medical School was opened in 1876 with the object of providing Orissa with a supply of qualified native doctors. The course of study extends over 4 years and is uniform with that of the other Bengal Vernacular Medical Schools. The staff consists of the Superintendent, 3 Assistant Surgeons and 3 Hospital Assistants. During the last 5 years the number of students who have entered the school each year has varied from 46 to 67, while the number of those who have passed the qualifying examination at the end of the course has varied from 15 to 24 annually. The school was formerly housed in the General Hospital, but in 1904 a new class-room was built, and another building is now being erected, which will contain another class-room, a library and the museums and laboratories that are required by a modern medical school.

Cuttack
Lunatic
Asylum.

The Cuttack Lunatic Asylum was opened in 1864 and has accommodation for 43 male and 6 female lunatics. The average daily population since its opening has been 56, of whom 18 were criminal lunatics and 38 non-criminal lunatics, the average period of detention of the latter being one year. There is no separate accommodation for criminals and non-criminals; the asylum is not very favourably situated, being in the centre of the town and cramped for space; and it is proposed to abolish it and transfer its inmates to a central Provincial asylum.

NAME OF DISPENSARY.	DISEASES TREATED.					Operations.
	Skin diseases.	Malarial fevers.	Intestinal worms.	Diseases of ear.	Veneral diseases.	
General Hospital, Cuttack	4,411	2,410	1,424	723	1,373	2,370
Municipal Dispensary, " "	4,829	1,969	3,766	667	584	1,311
Central Irrigation Hospital, Cuttack	157	161	16	21	...	31
Bānki Dispensary	1,426	986	194	204	162	506
Dharmshāla	1,234	624	567	283	29	579
Ganjā	1,101	972	312	336	75	275
Hukitālā	80	114	1	10	4	17
Jagatsinghpur	2,802	484	48	80	76	222
Jājpur	1,401	388	940	529	108	307
Kendrapāra	2,634	241	430	547	141	362
Nayā Bazar	1,640	1,474	680	364	228	336
Patāmundaī	903	120	407	495	127	390
Rājnagar	1,787	389	193	205	53	170
Total	24,514	10,332	8,978	4,775	2,900	6,882

NAME OF DISPENSARY.	RECEIPTS.			EXPENDITURE.	
	Government contributions	District and Municipal funds.	Subscriptions and other sources.	Establishment.	Medicines, diet, buildings, etc.
	Rs.	Rs.	Rs.	Rs.	Rs.
General Hospital, Cuttack	2,908	2,700	50,892	2,737	48,080
Municipal Dispensary, " "	177	1,936	126	873	1,059
Central Irrigation Hospital, Cuttack	1,637	...	...	1,020	616
Bānki Dispensary	1,078	...	...	648	430
Dharmshāla	154	851	290	1,013	282
Ganjā	8	...	846	494	360
Hukitālā	749	...	...	589	160
Jagatsinghpur	254	285	118	401	256
Jājpur	81	881	602	394	394
Kendrapāra	364	700	1,094	431	1,737
Nayā Bazar	152	989	...	754	387
Patāmundaī	14	647	360	684	337
Rājnagar	7	...	815	432	390
Total	7,583	8,989	55,143	10,470	54,488

CHAPTER V.

AGRICULTURE.

GENERAL CONDITIONS. AN account has been given in Chapter I of the three tracts into which the district is naturally divided, viz., the littoral, forming the sea face of the Bay of Bengal, the submontane, under the western hills, and between them a wide zone of highly fertile land intersected by a network of great rivers. To the east is a low-lying tract, which is of great natural fertility, where it is protected from the action of salt water ; but a great part is impregnated with salt and unfit for cultivation, while much of the rest is exposed to damage from storm-waves. This belt of country contains treeless expanses of rice-fields and grass-lands, sloping down into a desolate jungly tract, full of swamps, saline creeks and impenetrable morasses, the haunt of wild hog and deer and of enormous crocodiles. To the west a large part of the surface consists of a series of low ranges, 10 to 15 miles in length, spreading out into infertile table-lands of ferruginous clay and laterite. It is a region of high sterile land and rocky hills, covered with bamboos and scrub jungle, and intersected by narrow though fertile valleys. Between these two tracts lie the wide alluvial plains forming the delta of the Mahānadi, Brāhmanī and Baitarani rivers, where an extensive system of irrigation protects the crops from failure in seasons of drought and enables land to be cultivated that would otherwise remain barren. They present a gradual and steady slope from the high lands of the west to the sea, and a composition varying according to the relative proportion of the sand and silt of which they are formed. The surface is generally flat and presents the appearance of a dead level of rice-fields, but it is broken by the hills of Alti and Mātkatnagar in the centre, and is cut up by numerous river channels. In the west, where the mountains slope down to the plains, the lines of drainage are sufficiently marked by the great rivers, but in the delta proper the low levels lie not along the river courses, but in the valleys midway between them. The surface water gathers in many places in these intervening valleys into low marshes or temporary lakes, which are used during the dry season for the

cultivation of the *dāhua* or spring rice. In the central portion of this intermediate belt a large variety of crops are raised on the lands which are periodically enriched by river silt ; but along the western border and near the coast, winter rice is practically the only crop grown, as in the former tract the land is too high to receive deposits of silt, and in the latter tract the silt is deprived of most of its fertilizing power by the saline deposits of sea water.

u Cuttaek is primarily a land of abundant rainfall. Since 1860 Rainfall.
b the average registered fall for the year has been over 60 inches, it
v has occasionally been as great as 80 or 90 inches, and there have
s been only six occasions on which it was less than 50 inches. On
c the other hand, the rainfall is precarious, and an untimely or
unequal distribution is liable to cause the partial or complete
destruction of the crops, even if the actual fall does not fall short
of the quantity required. A heavy shower in February or March
is necessary to enable the land to be ploughed, but the most critical
months are May, September and October. If the May showers,
which are the precursors of the monsoon rains, do not fall, sowing
may be prejudicially delayed ; but deficiency in the rainfall in
September and October is even more dangerous, as it affects the
maturing of the staple rice crop. The most terrible famine the
district has ever known was caused by the failure of the September
and October rains in 1865 ; in 1896 with a rainfall very little
below the normal, serious loss was caused by the cessation of the
rains early in September ; and, on the other hand, the crops of
1876 and 1877 were saved by the rains in these months, in spite
of the very scanty fall of 41.28 and 41.13 inches. On the whole,
it may be said that a well-distributed rainfall of 40 inches is
sufficient to secure the crop, provided that not less than 4 inches
fall in October ; but in order to obtain a bumper crop at least 50
inches are required, of which 8 inches must fall in September
and 6 inches in October. In the last 40 years, however, the fall
of October has been less than 4 inches 15 times, and, generally
speaking, the cultivators have to face the prospect of having once
in every three or four years a rainfall less than the maximum
compatible with the ripening of the crop, and of suffering a
loss of a fourth to a half of the rice in the unirrigated lands.
Besides this, the district is liable to inundation from the rivers
overflowing their banks when swollen by heavy rainfall in the
hills. It is only however when they are of an extraordinary
height and of long duration, or when they occur so late as to
render resowing impossible, that very serious and widespread
damage is done by such floods. Provided that they are not too
high or of long continuance, and that they come early in the

season, they are productive of almost as much good as harm, as the fertilizing silt they leave behind renews the productive powers of the soil and assures excellent harvests.

Owing to the ample supply of rainfall in ordinary years, irrigation is far less essential than in less favoured parts of the Province, and, except for the canals, it is little used. An account of the value of the canal system as affording protection against a failure or partial failure of the rains in years of drought has been given in Chapter VI; and it will suffice here to say that the area irrigated from this source is 170,000 acres and that the canal embankments protect about 500,000 acres. This area is practically all under rice, and water is taken from April to December, the demand for it being greatest in May and June, when it is required for ploughing the land, in July and August for loosening the soil at the roots of the young plants, and in October for the final ripening of the crop. Well water is used only for watering garden crops and betel plantations; and irrigation from streams and tanks is generally confined to the more valuable crops such as sugarcane, tobacco, and cotton; in most parts of the district it is only resorted to for paddy in October and November.

Water-
lifts.

In the low-lying tracts near the sea water is taken from the small streams and creeks by means of the *tendā* or bamboo water-lift. This contrivance for raising water consists of two upright posts with a cross bar, which serves as a fulcrum on which a bamboo pole works; the latter is weighted at one end by a stone or mass of mud, and at the other a thin bamboo is fastened, with an earthen pot or bucket attached. When water is required the cultivator pulls down the bamboo pole till the bucket is immersed: as soon as the tension is relaxed, the weight attached to the lever raises the bucket of itself, and the water is then emptied into the *nodhā* or pipe, which is generally the hollowed trunk of a palm-tree, and is directed into the fields. When the field is any considerable height above the water, a platform is built on four stout bamboos on which a man stands to work the lever.

Where the water has only to be raised a few feet, it may be scooped up in a *senā*, a sort of basket made of split bamboo which two men use. Holding the ropes attached to either side, they swing it backwards, and bringing it down sharply into the water carry the forward motion of the swing through until the *senā*, now full of water, is raised to the level of the water-channel, when the contents are poured out. Another way of lifting water a short distance is with a scoop, called the *jantā*, which is made of a single piece of wood about 6 feet long, hollowed out and shaped

like one-half of a canoe, the broad open end of which rests on the head of the waterchannel. The pointed closed end dips into the water, and when this is raised the water pours naturally into the channel. It may be worked by one man either directly or with the help of a bamboo crane and counterpoise, as is done with the *tendā*, but it cannot lift more than a couple of feet. It is not uncommon for two of these methods to be combined, the water being lifted by the *tendā* into a reservoir, and from that into the water-channel by a *senā* or *jantā*.

The arable land in the plains consists of alluvium in which Soils.* sand and clay are intermixed in varying proportions; but the cultivators recognize a large number of different classes of soil, the names of which vary according to their situation, elevation and composition. In an ordinary village, the lands fall primarily under three main divisions according to their situation, viz., (1) The low lands retaining rain water and hence called *jala* or wet lands, on which winter rice is grown. These lands predominate in the district and comprise about 70 per cent. of the whole cultivated area. (2) The high lands round the village homesteads, which, being enriched by manure and household refuse, have a blackish colour and are therefore called *kalā*; they are devoted to vegetables, cotton, jute, and other valuable crops. The homestead land is also known by the generic name of *gharbāri*, and the land lying between this and the fields is called *gāntāh*. (3) The river-side lands (*pāla*), which, being periodically fertilized by deposits of silt, are suitable for growing tobacco, cotton, mustard and other *rabi* crops.

Arable lands are also classified according to their elevation, the low-lying lands producing rice being called *khal* and the high land *dhīpa*; those situated on a level between the two are known as *madhiāna*. The low lands are further divided according to the difference in level into *jora*, *dera*, and *gahirā*. *Jora* is the name given to the hollows which collect the drainage of the surrounding high lands, and, being always waterlogged, are used only in the dry season or for very coarse varieties of rice; the *dera* lands are those situated at a higher level on the sides of the hollows; and the *gahirā* lands are those lying still further up. In hilly country the hollows lying between the upland jungle-covered ridges are known as *gorodā*. High lands which are not enriched by silt and cannot retain rain water are contemptuously referred to as waste land (*thenga*, *thengi* or *dānga*). The soils are again divided into

* This account is based on that given in the Report on the Agriculture of the District of Cuttack by N. N. Banerjee, M.B.A.C., to which I am also indebted for other information contained in this Chapter.

four great classes according to their composition, viz., (1) *Matāl* or clay lands, (2) *Dorasā* or loamy soils, (3) *Bāliā* or sandy lands, and (4) *Patu* or alluvial soils. The ryots, however, recognize a large number of minor distinctions and give different names to the soils according to the extent to which clay, sand, loam and silt predominate in their formation. (1) *Matāl* is the name given to all kinds of stiff clayey soils. Rice and sugarcane are the principal crops grown on them, but besides these, wheat, *birhi* and *kulthi* are also cultivated. (2) *Chikitā* is a strong sticky clay, which is almost too stiff to be used for successful cultivation, and grows for the most part coarse varieties of the *sārad* or winter rice. The outturn on such lands is said to be generally very poor. (3) *Chauria* is also a hard clay, which is very liable to cake on being exposed to the sun when ploughed. It generally cracks into hard blocks on getting dry, and is altogether an inferior soil. (4) *Dorasā* is a mixture of sand and clay in nearly equal parts. It is used for *biāli* or autumn rice and for all *rabi* crops. It is easily worked and is retentive of moisture. (5) *Telbāliā* is the name given to a loam which contains a larger admixture of sand than the *dorasā* lands. It is looser in texture, and being poorer, requires more manuring than the latter. (6) *Bāliāmatal* is a loam with a large admixture of earth; in other words, a rich sandy loam. (7) *Rangāmāti* is a red ferruginous sandy loam occurring near laterite rocks. Like *telbāliā*, it requires a great deal of manuring before it can produce a good crop. (8) *Thenga jami* is an elevated sandy loam with very little moisture, which as a rule is allowed to lie waste, though sometimes ploughed up for growing *biāli* paddy, *māndiā*, and *kulthi*. The crops on such lands are necessarily very poor. (9) *Bāliā* is the name given to very loose sandy soils which grow the poorer kinds of *rabi* crops. (10) *Patu* is an alluvial soil, formed from silt deposited by floods. It is used for tobacco, jute, coriander and mustard, and is taken advantage of to grow all kinds of miscellaneous crops. (11) *Pankuā* is a black mud unmixed with sand, such as is found at the bottom of ponds and tanks. (12) *Rektimatal* is a stiff rich soil. (13) *Pansiā* is a loose though comparatively fertile soil. (14) *Gengutiā*, as the name would signify, is applied to a clay containing an admixture of *genguti* or lime, which is met with near those river-beds which contain nodulous limestone. An admixture of clay and limestone dust is in some places known as *khali*. (15) *Nunājami* is land which is more or less of a saline nature. It is generally of very little use; but a few varieties of *laghu sārad* rice are grown on it when it does not contain an excess of salt.

The staple crop is rice, which is grown on 1,195,000 acres,* of over 97 per cent. of the cultivated area. The varieties grown are very numerous, but they all fall under one of three heads according to the season at which they are sown and reaped, viz., (1) *Biali* or early rice, sown in May or June and reaped in August and September; (2) *Sârad*, or winter rice, sown in June and July and harvested between October and January; and (3) *Dâlua*, or spring rice, which is sown after the floods have subsided and is harvested in March and April.

The most important of all these crops is the *sârad* or winter rice. It is divided according to the amount of water it requires into *guru* or heavy and *laghu* or light varieties, the *laghu* paddy being grown on moderately low lands which are wet or covered with six inches to a foot of water from June to October, while the *guru* paddy is grown at a lower level. The rice-fields vary in size ranging from small plots covering $\frac{1}{8}$ th of an acre to large fields occupying an acre of ground. They are enclosed on all four sides by small ridges (*hira*) about a foot in height and breadth, in order that the rain water collected in these artificial shallows may keep the plants wet; otherwise the land losing its moisture, the plants would quickly wither and the crop be lost.

After the winter crop has been harvested in December, the cultivator is on the look out for the first shower of rain to plough his land. The time of ploughing necessarily depends on the rainfall, but if the cultivator is lucky, this occurs in February. As soon as the first shower falls, the country is covered with miserable-looking half-starved cattle dragging primitive ploughs, which as a rule never penetrate a foot below the surface of the soil. The land is ploughed as often as the weather and the resources of the cultivator permit, but as a rule four or five ploughings are considered sufficient. The soil after being turned up is exposed to the action of the sun and wind, and those lands which lie beyond the reach of the fertilizing river silt are manured. The peasant then waits for the showers which usher in the monsoon, and starts sowing as soon as they appear in May or June. The plants germinate in 15 days, and consequently the earlier the seed can be sown and the stronger the young plants are when the rains set in, the better is the chance of a good crop. During the latter half of June and the first half of July the growth of the rice is helped by the monsoon rains, and the cultivators have little to do but watch the young plants growing up, mend the small ridges round the fields, and do similar odd jobs. During the rest of

PRINCIPAL
CROPS.
Rice.

Winter
rice.

Broadest
culti-
vation.

* The figures showing the area under various crops are the averages for the 5 years ending in 1903-04.

July and August when the plants have attained a height of about 15 inches, there is the important operation called *beusan* (literally changing of place) to be performed. This consists of driving the plough through the young rice in order to thoroughly loosen the soil at their roots; the rice plants are then firmly replanted by hand and a sort of blunt harrow is driven over the field to level and consolidate it. The ridges enclosing the fields are then finally strengthened, the grass cleared away from them, and the weeds removed. For these operations an ample supply of water is necessary, and if this is available and there is sufficient rainfall in September and October, a good harvest is secured in November and December.

From the preceding account it will be clear that the times of sowing and reploughing are two important periods when the *sārad* crop requires water, but by far the most critical period comes in the middle of October, when its fate depends entirely on there being enough water to mature it and to fill out the ear. At the first period no artificial irrigation is possible, and the people depend on rain water. At the second and third periods lands commanded by the canals, or about one-fourth of the cultivated area, can always get a plentiful supply of water, and under normal conditions the other lands also get sufficient rain water; but in years of deficient or unevenly distributed rainfall the people are obliged to irrigate the crop from every available natural or artificial reservoir. Fortunately, the people have now learnt to appreciate the value of canal water, but for many years they refused to realize that the loss of their crops from drought more than counterbalanced the saving of the water-rate. If the rain held off, the ryots grew daily more and more anxious; and though they began to discuss ways and means and the advisability of taking a lease of canal water, they took no steps in that direction; and it was not till the crop was irretrievably damaged to the extent of a fourth or a half that they took action. Then a panic would ensue, the whole country coming to the canal officer to demand water at a moment's notice over a vast area of parched and thirsty land, and, we are told, "ready to sign away their very lives in the urgency of the moment."

Nearly all the *sārad* rice is broadcast, transplantation being an unpopular system of cultivation, as it involves more labour, and the transplanted seedlings are very delicate for the first month and liable to injury by flood and still more by drought; it is estimated that only 4 per cent. of the cultivated area grows transplanted rice. It is, however, admitted that, when successful, transplantatio

gives a larger yield; and it is resorted to for fields, especially for those under irrigation, which grow a *sārad* crop after *biāli*, to get rid of the wild paddy, called *bātungā*, to avoid the risk of early floods, and to replace the loss of the broadcast crop, if it is destroyed before the end of July. The seeds are sown either wet or dry in a nursery, which is generally a field near the village well manured and fenced in to keep off jackals and other animals. The land is carefully watered, and when the seedlings are a month old they are transplanted into the rice-field. The latter is prepared by ploughing and manuring in the same way as for broadcast rice, and is once again ploughed and harrowed before the young plants are planted. The seedlings are arranged in bunches of three or four plants with a small space between each bunch; the roots are carefully imbedded to the depth of a couple of inches; they are then left and require no further attention beyond a good weeding and a copious supply of water. The earlier the transplantation is done, the better the results, and the proper time is considered to be from the middle of June to the middle of July.

The *biāli* or early rice, which is always sown broadcast, ranks next to the *sārad* rice in importance. There are two main classes of *biāli*, viz., the early variety, called *sāthikā* from the fact that it comes to maturity 60 days from the date of sowing, and the *bara dhān*, ripening about a month later, which supplies the people with a food-grain only second in importance to the lowland paddy. Both varieties are grown on the higher lands of the villages and for preference in a light loamy soil; they are sown and reaped in the rainy season. The whole crop is more precarious than the winter rice, being injuriously affected by drought in June and July, and being also liable to destruction by heavy floods early in the season. A failure of this crop does not however affect the people very seriously, as loss can generally be recouped by a good harvest of winter rice. If the *biāli* is damaged by a deficiency of rain or by inundation, and there is no time for resowing, the lower lands at least can be sown with *sārad*, which with seasonable rainfall gives a good harvest, and so makes up for the loss occasioned by the failure of the early rice. On the other hand, if the rain is well distributed in the early part of the season but fails at its close, a bumper crop of *biāli* will in part at least compensate for the *sārad* crop being spoilt. *Biāli* rice is followed on high lands by pulses, generally *kulthī* or *birhi*, and on alluvial or homestead lands by mustard and linseed; in rich soil under irrigation or in favourable seasons *laghu* paddy is transplanted to the lands from which the *biāli* has been cut.

Dālua
rice.

Dālua is a coarse variety of rice, which is grown in the Kharsnā and Brāhmanī estuaries on low swampy grounds and on lands too heavily waterlogged to yield *sārad*. Clay lands subject to tidal inundation are commonly chosen for the purpose, as irrigation is easy and the crop is not affected by saline matter. It is sown in winter and reaped in the spring, and therefore requires constant irrigation. Canal water is utilized for the purpose in the area commanded by the distributaries, but elsewhere it requires no artificial irrigation, as being planted along marshes and tidal waters a natural supply is generally available. The crop may be either transplanted or broadcast, but the former method is the more common. A nursery is selected in the corner of a field or tank, in which the seedlings remain till they are about a foot high; they are then imbedded in the rice-field which has been ploughed till it is a pulpy mass, and this is kept covered with water till the seed flowers. It ripens in March or April, and the crop is then cut. The area covered by it is not large, and it is only in the low-lying lands to the north of the district that it is a staple crop.

Outturn
of rice.

From the experiments conducted at various times it appears that the outturn of clean rice per acre is $13\frac{1}{2}$ maunds for irrigated and 12 maunds for unirrigated lands. The estimates of the Public Works Department show a much greater difference between the yield of irrigated and unirrigated lands, but their experiments are conducted in an area where all the best lands are irrigated and where the exclusion of river silt and systematic drainage have made a supply of water absolutely necessary. Outside this area the heaviest crops are raised on lands rich in river silt; and in ordinary years the average outturn of these lands is not very much less than in the irrigated country.

Other
cereals
and pulses.

After rice the most important cereal is *māndiā* (*Eleusine Coracana*) covering 15,100 acres, mostly in the central portion of the district. It is a cereal with a small reddish grain, which is grown on high light and inferior soils on which *biālī* rice would hardly succeed. Sometimes it is sown broadcast in May, but more often it is first sown in seed-beds and then transplanted in June. The crop, which requires good rain in June and July, ripens in August and September, and yields about 6 to 8 maunds of seed to the acre. This is ground into flour and eaten with cakes and rice by the lower classes; it is said to have the merit of producing such a feeling of satiety that after a full meal a man is not inclined to eat again for 24 hours.

Wheat is grown to a small extent on upland fields after rice, and generally on loamy or silt-covered soil; it occupies only 1,500

acres. It is sown broadcast in October or November and is reaped in April; as a rule it is left to grow up in the meantime as best it can. Barley is grown on light sandy lands, especially in areas exposed to inundation, and occupies the land from November to March. The area under this crop is insignificant, being only 1,000 acres. Other food-grains, including pulses, are produced on 114,600 acres; the only other cereal which need be mentioned is *china* (*Panicum miliaceum*), which is more largely grown than wheat or barley, but is of little importance; and after rice it is on the pulses sown in the autumn and harvested from January to April that the people depend. The commonest and least valued of these is the pulse called *kulthi* (*Dolichos biflorus*), grown on poor lands after *māndiā* and early rice, or on yet higher sandy lands which produce no other crop. The seed, which is like a dark flat pointed bean, makes an excellent food for cattle and horses; it is also boiled and eaten with rice by the poorer classes, and is even taken alone in times of scarcity. *Birhi* (*Phaseolus radiatus*) is a more valuable crop grown after *biāli* rice where the land is rich enough, and is found chiefly in inundated areas. It yields a little round pea, which is given to cattle and also eaten as a pulse in the form of *dāl*. *Muga* (*Phaseolus Mungo*) is the pulse most largely consumed by the better classes. Though not so general in its distribution as *birhi* or *kulthi*, it is the commonest *rabi* crop grown on *sārad* lands; it is found chiefly in the flooded *ra*cts in the south of the district. The only other pulse calling *am* separate mention is *harar* (*Cajanus indicus*), of which there *st* are two varieties—the *deo* or *nāli* harar grown on homestead *l*ands and the *chaitā harar* raised on river-side lands after *biāli* *l*addy. The former variety is found in the west and centre of the *l*istrict, and the latter is most largely grown on the border-land *l* between Cuttack and Puri, and in the Brāhmani basin, where it *l* was the only crop which saved the people from starvation in many *l* villages during the scarcity of 1896-97.

l Of all the oil-seeds, mustard and rape cover the largest area, *Oil-seeds.* *l* being grown on 13,600 acres. Mustard is grown on rich loamy *l* after a crop of rice and is commonest in the south of the district. *l* It is one of the most valued of the *rabi* crops and its oil is used *l* for anointing and cooking purposes. *Til* or gingelly is raised *l* on 5,200 acres, linseed on 4,000 acres, and the total area under *l* all other oil-seed crops is 13,000 acres; the most important of *l* these is the castor-oil plant, which is usually found on homestead *l* lands or in sandy fields along the beds of rivers, it being a *l* peculiarity of the plant that it will grow in a depth of sand which *l* would kill other crops.

Fibres.

The two chief fibre crops are cotton and jute. Cotton, which occupies 7,100 acres, is generally grown on homestead lands which can be watered from tanks and canals, or on rich alluvial soil by the riverside. The cultivation of jute is confined to the irrigated area in central Cuttack and Jājpur, and the area devoted to it is small (7,800 acres). Like cotton, it is grown on homestead or riverside land, where an extra rent has generally to be paid for the privilege of cultivating it.

Dyes.

Indigo is the only dye grown in the district. It was introduced by a Muhammadan merchant who established a factory at Kenduapatnā near the Kendrāpāra canal, but the area under it (200 acres) is insignificant.

Tobacco.

The tobacco plant, commonly called the *dhuānpatra* or smoke leaf, is one of the most valuable crops grown in the district, though the total area (7,500 acres) given up to it is small. It requires a rich loamy soil and a plentiful supply of water, and is only raised on rich silt-covered lands, on the banks of rivers, and in the depressions of the big flooded *pāts* or drainage lines. The finest leaves are obtained on a sandy sub-soil with a thin covering of pure silt. The profits of tobacco cultivation are very large, and it is estimated that one acre will bring in a net profit of Rs. 75. It is not possible however for one man to cultivate more than a quarter of an acre, owing to the unremitting toil it requires, and people having larger areas fit for tobacco sublet them to their neighbours. It is such a paying crop that many villages in southern Cuttack, especially in the *parganas* of Saibir, Deogaon and Sailo, depend on it for the payment of their rent.

Miscellaneous crops.
Sugar-cane.

Sugarcane, which covers 5,000 acres, requires a loamy soil and is grown generally on lands near the village and within easy reach of canal irrigation, or on the edges of natural water-courses, where the land is out of the range of canal water. It is a crop requiring incessant attention and involving a large expenditure of time, labour and money. The field has to be ploughed some thirty times and richly manured before the cuttings are planted in January or February. Then constant irrigation is necessary, and the soil has to be loosened and oil-cake and mustard oil applied to the roots. These processes are repeated at intervals, the land being irrigated so as to keep it continually moist; and after the fourth application of oil-cake in May or June, the soil is loosened by the plough and the land weeded. The stems are then wrapped in sugarcane leaves and tied up; after another weeding in August the leaves are bound together and the plants tied together in fours to give them greater power to resist the storms. Finally, in December the canes are cut down and the

juice is extracted; the mills used for this purpose are extremely primitive, and the use of the improved Bihia roller mill has not yet become general.

The cultivation of the climbing vine called *pau* (*Piper betel*), ^{Betel.} the leaves of which are used to wrap up the *supari* or areca-nut chewed by natives of all ranks and classes, is not extensive, but its history is of some interest. It was introduced by some men of the Bāruī caste who came from Bengal and settled down in Cuttack. It is still grown for the most part by men of this caste, but it is no longer confined to them, as the profits of the crop have attracted other castes, and now Khandaits, and indeed all castes but Brāhmans, cultivate it. The finest *pau* is grown at Barkud in the Kujang estate, where the immigrant Bāruīs first settled; and the greater portion of the district, especially the markets in the Kendrapāra sub-division, is supplied with betel-leaf from their plantations. There are also valuable gardens in Kodindā close to Cuttack and in the Jāipur sub-division, as well as in other parts of the district, but they are not so well known as the plantations of Barkud, which are jealously guarded from intruders, as the delicate plants, according to the growers, cannot bear any noise or disturbance. Under the sheds the leaves may be plucked and smelt, but not eaten, and women are not even allowed to bathe in the tanks and ponds from which the creepers are irrigated. The betel requires the most careful cultivation, but the crop is extremely valuable and the large profits amply repay the labour and expense which it entails; it is estimated that during the 18 years which may be taken as the average life of a garden—at the end of that time it grows to a manageable height and has to be abandoned—the cultivator are still a net annual income of Rs. 131-10 for one *gunt* or .08 two *sāf* land.

ance of the most important of all the garden crops is the *brinjal* or ^{Vegeta-} *(Solanum melongena)*, and its cultivation is very general. ^{bles and} *sāru* or caladium (*Colocasia antiquorum*) produces a tuber ^{fruits.} Beng is very largely eaten by the people. Onions are common, at Cucumbers of many kinds are grown in homestead lands and Ind be seen climbing over the roofs of the houses in nearly every village. Pumpkins are also very generally grown; nearly every cultivator has a plant in his homestead, and they are also raised on a larger scale on sandy river-side lands. Potatoes have been recently introduced and are grown successfully at Cuttack town, where their cultivation is being quickly extended. The most popular fruit is the plantain, which is grown in nearly every part of the district; it is eaten as a fruit and also with curries, as, like the *brinjal*,

it forms the basis of most of the vegetable curries which please the palate of the Oriyā. Mangoes grow freely and form a very valuable addition to the food of the people during the hot weather, though their quality is decidedly inferior to the Malda and Bombay varieties. Pine-apples are grown in many villages, but are not plentiful enough to form a very valuable article of food. Among other fruits are the *bel*, jack, tamarind, Indian plum, custard apple and papaya. Spices, turmeric, chillies, coriander and ginger are used largely in cooking, but the area they cover (1,200 acres) is too small to meet the demand, and there is consequently a considerable import, especially of the more valuable kinds. There are altogether 75,000 acres under garden crops and orchards.

EXTENSION OF
CULTIVATION.

In the beginning of the 19th century the district had been reduced to a terrible state of desolation by the grinding tyranny of the Marāthās. The hereditary heads of the people had fled to the Garjāts where the independent tributary chiefs gave them protection in their hilly and jungly retreats; no land-holders could at first be found to engage for the lands; the ryots had found from bitter experience that they could get land on more favourable terms in the hills and had better prospects of enjoying the fruits of it; and the population was consequently insufficient to till the fields. A traveller who visited Cuttack in 1806 found himself in danger of wild beasts from the moment he entered the Province. Between Balasore and Cuttack, in a country now thickly populated and closely cultivated, he passed through a jungle abounding in tigers and required a guard of sepoy for the journey. Since that time cultivation has extended steadily under a settled government, though it was at first impeded by frequent droughts and by the injudicious settlements made in early years of British administration; and now there is much land left for reclamation in the central portion of the district where the pressure on the soil has almost reached its limit. The statistics available for the temporarily-settled estates afford a valuable index of the development of cultivation since the settlement of 1837 was concluded. The cultivated area in these estates was then 697,000 acres, and the next 60 years witnessed an increase of 32 per cent., the area shown as under cultivation at the last settlement being 920,000 acres. The increase must have been still greater in the permanently-settled estates which lie on the seaboard and the hilly border region to the west; it has been most rapid in the north-east of Cuttack, but it has been general throughout the district and has steadily gone on with the growth of population, though it has occasionally been retarded by calamities such as the cyclones of 1885 and 1891. Many villages

were deserted after the first disaster; the breaches it caused in the natural sea embankment of dunes or sand-hills were made worse by the cyclone of 1891; and areas which used to be cultivated were consequently swept by the salt water at high tides or when the tide was backed by a stiff breeze. The canal system does not appear to have been a special cause in the extension of cultivation; the increase has been no greater in the protected and irrigated areas than elsewhere; and the enquiries made on the subject have failed to elicit any evidence of a substantial extension of cultivation to lands which but for the canal water were not likely to have been reclaimed. At the present day the normal area* under cultivation in the whole district is 1,223,500 acres, of which 273,300 acres are twice cropped. Altogether 863,770 acres are not available for cultivation, but there are still 155,000 acres of culturable waste; much of this lies in the south-west of the district where the soil is very poor, or consists of scrub jungle at the foot of the hills; and it is doubtful if it will be brought under the plough for many years to come.

The Oriyā is a very conservative cultivator and has an apathetic indifference to agricultural improvements. Various experiments have been made from time to time in the Government and Wards' estates with new crops and modern implements, but these experiments have had little effect on cultivation generally. Various new crops have been tried such as potatoes, ground-nut, Nankin cotton, Buxar wheat, long-stemmed rice, sugarcane, etc., but, with the exception of sugarcane and potatoes, they have not made much way with the ryots. Efforts have also been made to introduce improved implements like Sibpur soil-inverting ploughs and the Bihā sugarcane crushing mills, but with little success. The people are still wedded to the heavy old-fashioned Cuttack ploughs with two sides shaped like mould-boards which give them the appearance of ridging ploughs; and nothing shows their conservatism more clearly than their failure to adopt the improved sugarcane mills which have become popular almost everywhere else in Bengal. An experimental farm has recently (1904) been started at Cuttack, in order to carry out the recommendations of the Indian Irrigation Commission and to show the cultivators what can be done with water always at command; but it is too early as yet to say what success is likely to attend this venture. No advances have been made under the Land Improvement Loans Act, and little advantage has been taken of the Agriculturists' Loans Act; even in the lean years 1896—98 only Rs. 38,775 was advanced under the provisions of the latter Act.

Improved
methods
of culti-
vation.

* The average of the 5 years ending in 1933-04 is taken as the normal area.

Manures.

The same conservatism is noticeable in the use of manure, as though the Oriyā is to a certain extent alive to its advantages, he will not use it unless his ancestors have done so, and applies it less freely than the cultivators in other districts. As in other parts of Bengal, cow-dung is the most important manure, but its value is much diminished by the negligent manner in which it is stored, and the feeding of cattle is so poor that it is not rich in manurial constituents. Besides this, a great deal is lost by its conversion into fuel cakes, as except in a few favoured localities firewood is scarce and its high price renders its use prohibitive for the ryots. For the most part, therefore, cow-dung only finds its way to the soil in the form of ashes; and the only other manure in common use consists of household refuse. These manures are spread on the rice lands at the time of the first ploughing, and are also applied to sugarcane, betel and vegetables. Oil-cake is also occasionally used as a top-dressing for these valuable crops. A strong prejudice exists against the use of night-soil and bone-meal, and chemical manures are practically unknown. The feeling against the use of bone-meal is particularly intense. In selecting a site for a building the greatest care is taken to remove all bones that the land may contain, as they are supposed to bring about ill-fortune, and to cause the inmates of the house to die without heirs. The more superstitious even go through certain ablutions and ceremonies before re-entering their houses, if they happen to stumble across a bone in their fields.

Rotation.

The scientific rotation of crops is not adopted as a principle of cultivation, but as a matter of practice rotation is observed in the case of the more exhausting crops. Sugarcane is never grown on the same land year after year, and when cultivated on *sārad* rice lands, it is alternated with paddy or follows a fallow, and is only grown on the same land once in four years. The lighter soils which bear early rice usually yield two harvests. When the crop has been harvested, the land is prepared for the usual *rabi* crops of pulse, wheat, barley, etc., and it is a common practice to grow *birhi* after the *biāli* crop and then to use the land for sugarcane. The mixture of pulses and cereals serves the purpose of rotation, as the pulses belong to the leguminous family and enrich the soil with nitrogen.

CATTLE.

The cattle are similar to those found in the southern districts of Lower Bengal, but, owing to deficiency of pasture, the stock is generally poor. Some improvement has however been effected in the towns and a few places in the rural areas by crossing the local breeds with bulls imported from up-country. Pasture grounds abound on the seaboard and along the foot of the hills. During

the hot weather large herds of cattle are grazed in the low-lying lands of Kujang, Kanikā and other estates on the coast, and are driven up to the jungly uplands on the west in the rains. Elsewhere the ground retains little moisture during the hot weather, and the grass being parched up by the burning sun, fodder is scarce. Cultivation has encroached on the grazing lands for many years past, though much has been done in the course of the recent settlement to reserve lands for pasturage; and the cattle have to be content with the dry stubble of the fields and such scanty herbage as the road-sides, river-banks, tank-banks and the boundary ridges of the fields afford. A cheap and abundant supply of *birhi* and *dhali* is always available, but though these pulses make an excellent food for cattle, very few can afford to give them; while even straw which might eke out the scanty supply of grass is largely used for thatching purposes. In the dry months therefore the cattle have only what they can pick up in the fields, though they are partly stall-fed on chopped rice straw while at work; they are generally underfed and miserably housed, and no attempt is made to improve the breed.

The sheep bred in the district are small in size with a short rough wool. Goats abound but are also small, though the breed imported from the south are somewhat larger. Pigs of the omnivorous kind found everywhere in Bengal are bred by Ghurisriās. The only horses are the usual indigenous ponies; they are few in number, undersized and incapable of much hard work.

The diseases most prevalent among cattle are rinderpest and foot-and-mouth disease. In 1903-04, 1,042 cases of foot-and-mouth disease were treated by itinerant Veterinary Assistants, and there were altogether 1,241 cases of rinderpest—a total exceeded only in Khulnā and Palāman; but in 1904-05 these cases fell to 384. Veterinary assistance is also afforded at a dispensary in Cuttack town, where out-patients are treated; 88 horses and ponies and 481 cattle were under treatment in 1904-05.

CHAPTER VI.

EMBANKMENTS AND CANALS.

NECESSITY
OF
PROTEC-
TIVE
WORKS.

OWING to a well-known peculiarity of alluvial rivers, the water which is poured down upon the plains from the western hills greatly exceeds the volume which the lower channels are able to carry off. The rivers issue from the hills heavily laden with sediment which they deposit when their velocity is checked by the almost dead level of the delta; the fall in the Mahanadi and Baitarani averaging from about 2 feet per mile where they enter the plains to 9 inches at tidal water, while that of the Brahmani is still less and does not anywhere exceed 14 inches per mile. The same process is repeated in the numerous channels into which they divide before they reach the sea; and their beds thus becoming gradually shallower, their capacity of discharge is greatly reduced. The most noticeable feature of this portion of their course is the meagre stream of water they bring down in the dry season, as compared with their great breadth, the shallowness of their beds, and their paroxysmal violence at periods of flood. In the hot weather they are nearly dry, and their beds consist of vast level stretches of sand, striped by long reaches of land-locked water, through which small streams meander from bank to bank. But in the rainy season, and especially after a storm has burst in Central India, they present an extraordinary contrast. These three great rivers collect the drainage of over 65,000 square miles; the entire rainfall of this enormous catchment area requires to find an outlet towards the sea; and the rivers rising with great rapidity dash down their concentrated floods on the small deltaic area of 3,600 square miles. The level strip between the mountains and the sea, which in itself has a rainfall of 60 inches in the year, has therefore to find an exit for the drainage of a territory of 15 times its own area; and the distributaries and channels often prove insufficient to carry off this enormous volume of water.

In their upper reaches they have a rapid flow and carry away the soil, but when they reach the level plains, their speed is reduced, and their torpid current is no longer able to support the solid matter hitherto held in suspension. They accordingly deposit it

in their beds and on their banks, which are in this way raised above the level of the surrounding country. In fact, they practically run on ridges; and as their lower reaches have not a sufficient capacity for the vast amount of water they bring down in flood, they spill over their banks to a greater or less degree according to the chances of the season. In very high floods the excess discharge would inundate the surrounding country, were it not for the embankments; but even with the embankments a very large proportion pours down upon the rice-fields. Fortunately, the periods during which these vast rivers remain in high flood are not usually of long duration. The source of the Brāhmanī supply being more local, it both rises and falls more rapidly than the other two, the floods in it rarely lasting above 3 days; floods in the Baitaranī commonly last 3 or 5 days; and of the three rivers the Mahānadi takes longest to rise and remains longest in flood. In the rainy season therefore they would be liable to devastate the delta if left without control; and on the other hand, they fail to yield a trustworthy supply of water in the hot weather. The maximum recorded discharge of the Mahānadi is about 1,600,000 cubic feet per second, the average of the rainy season being about a third of this amount; in the Brāhmanī it is about 500,000 and in the Baitaranī 260,000 cubic feet per second; while the minimum discharge is 70, 129 and 204 cubic feet per second in the Baitaranī, Brāhmanī and Mahānadi respectively. An enormous mass of water, aggregating about 2,360,000 cubic feet per second, is thus thrown down in time of flood, while in the hot weather the total supply has been known to dwindle to 400 cubic feet per second; and the great problem which Government has to solve is how to prevent the rivers from destroying the crops during the rains, and how to husband them for agriculture and commerce during the dry season.

The liability of the district to devastation by flood has been EMBANK- aptly described by Stirling. "The whole of the Mogulbandi," MENTS.
he says, "between the Chilka lake and the Brahmani river, is peculiarly subject to inundation from its proximity to the hills, the astonishing rapidity with which the torrents descend in the rains, and the strange conformation of the channels of some of the principal rivers, which are very broad within the hills but

level of the town and station by a height of nearly 6 feet, and was only restrained from overwhelming them by a solid embankment faced with stone and supported by buttresses, the work of former Governments. The defence alluded to, however, called the revetment, has yielded in places within the memory of man, and the consequences were of course most tremendous. The Cuttack rivers are generally swollen to an extreme height about three times during each rainy season, and at such periods the crops and villages in many portions of the district are exposed to imminent hazard. To guard against the evil as much as practicable, embankments have been always maintained by Government, at a large expense. The embankments or *bunds* are solid mounds of earth, well sloped and turfed on either side, the principal ones measuring from 40 to 50 and 60 feet in breadth, and 8 to 16 in height. The havoc occasioned by the bursting of one of these large *bunds* is generally most serious. The torrent rushes through with a frightful roar and velocity, tearing up trees by the roots, prostrating houses, and washing clean away every trace of the labours of the peasantry. The devastations of the flood too are, in general, more permanently commemorated by a deposit of coarse sand, which renders the soil in the neighbourhood of the breach unfit for tillage for years afterwards."

Early
history
of the
embank-
ments.

Embankments intended to secure protection against destructive inundation appear to have existed in very early times, but whatever ancient works there were must have been isolated; and it has been held that they were rather of the nature of mounds on which villages were built, while the country generally was open to inundation. Under the Marāthā Government the zamindārs were bound to maintain embankments, and for this purpose were allowed certain deductions from the revenue they paid. This system, however, proved so eminently unsuccessful that from the earliest days of its administration the British Government undertook their maintenance and repair, and spent large sums on their upkeep. The old embankments were constructed at those places where the banks were specially low, in order to guard against the spill of the rivers during an ordinary flood. These embankments, by confining the spread of the water, raised its level, and so necessitated longer and stronger embankments to resist the flood.

which raised the level

until 1855, or that anything was done beyond maintaining and improving the existing embankments. The matter was then forced upon the notice of Government; in the preceding three years very destructive floods occurred, which caused nearly 3,000 breaches; and finally the high flood of 1855, when the embankments were broken in 1,365 places, directed attention to the critical state of the revetment which protects the town of Cuttack, as well as to the broader question of destructive inundations in the district generally.

It was found that the head of the Kātjurī was enlarged greatly after each year's flood, and admitted a larger volume of water than its branches could possibly carry off, while at the same time the head of the Mahānadi was silting up and not carrying off its proper portion of the floods. In order to remedy this evil, a spur was constructed at Narāj with the object of regulating to some extent the relative discharges of the two rivers in accordance with the capacities of their channels: this spur was subsequently developed into the Narāj anicut, and as such still regulates the volume of flood entering the Kātjurī branch of the river.

No systematic scheme was however sanctioned, as it was recognized that the proper control of such a vast river required the engineering advice and experience; and it was decided not to enter on such a vast undertaking as the remodelling of the embankments till the whole question of the utilization of the water supply of the delta had been examined. Sir Arthur Cotton was accordingly deputed to report on the measures necessary for the management of the Mahānadi; and as a result of his investigations, he came to the conclusion that the small works already executed had commenced to have effect, and that it would be easy to turn back the larger portion of the water into the Mahānadi. He pointed out however that this expedient would only restore things to their former state, which was such that the whole delta was continually subject to awful droughts and flood; and he maintained that the only effectual remedy was to carry out a system of works which would completely regulate the waters of the Province, similar to those in the Godāvari and Kistna deltas.

The canals which were eventually constructed were, accordingly, designed not only for irrigation and navigation, but also for protection from floods. The rivers run along the highest lines in the delta, so that when once they overflow their banks the surrounding country is inundated, and for a similar reason their margins present the most favourable alignments for canals intended

Canal
embank-
ment.

margins of the great rivers, and having on the side next each river an embankment to keep out the floods. To control the flow of water down the respective canals and to regulate the discharge of the rivers in flood according to the natural capacities of the channels, extensive dams or anicuts of masonry were constructed with scouring sluices and sluices of discharge; and in order to afford relief from inundation, embanked escape channels were formed along the natural depressions which present themselves in the deltas of each river. This system was the first great attempt to grapple with the difficulty. There can be little doubt that, until the construction of the canals, the embankments were never thoroughly efficient; they were no doubt of some use in ordinary floods, and more or less protected villages from the strong currents; but in time of extraordinary floods they were of little use and were generally liable to be breached.

System of
main-
tenance.

In the year 1866 there were about 510 miles of Government embankments and 248 miles of zamindāri embankments in the district; but most of the latter, when originally constructed, were of insufficient height and strength to withstand heavy floods, and had since fallen into disrepair and become useless. From 1866 onwards the embankments were much strengthened, but the question of the degree of efficiency in which they should be maintained was not raised till 1881. They had not been aligned on any scientific system, and it was physically impossible, without abandoning many of them and remodelling the remainder on an extensive scale, to render them capable of affording protection against high floods. A special enquiry was made regarding the expenditure required to put them in an efficient condition; and it was ascertained that in the case of the embankments on the Mahānadi alone the cost would be 45 lakhs of rupees, and that it would be necessary to construct embankments of such an enormous height that in practice it would not have been possible to hold them except at a very heavy cost. It was accordingly decided at the end of 1881 that the embankments should be kept up in the condition in which they then existed. Since that year the embankments have been maintained in much the same condition of efficiency; in repairing them care has been taken not to raise their height; and unauthorized additions have been prevented, as it was found that in previous years they had frequently been raised or lengthened, with the result that particular localities were protected, but that damage was caused elsewhere. A further examination of the embankments was therefore made in 1896 and 1897, in